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INHIBITION OF LACTATION BY SYNTHETIC OESTROGENIC SUBSTANCES

WITH SPECIAL REFERENCE TO DIENOESTROL*

BY

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The hormone control of lactation was reviewed by Nelson (1936). He concluded that the ovarian hormones, which are present in enormously increased amounts in pregnancy, are necessary for the development of the breasts, but inhibit the secretion of milk. The initiation and maintenance of lactation depend on the anterior lobe of the pituitary. After parturition the oestrogenic hormone ceases to be produced in large amounts, and with this release of control lactation begins. A further factor in the maintenance of lactation is the stimulus of suckling, the mechanism of which is obscure; nor is it known how the oestrogenic hormones inhibit lactation, though it is assumed that they do so by inhibiting the action of the anterior lobe. Folley (1936) showed that when the oestrogenic hormone was administered to the lactating cow, lactation was inhibited and the milk yield was reduced. This effect was temporary and depended on obtaining a high level of oestrogen in the blood. Folley and Kon (1936) studied the effect of sex hormones on lactation in the rat. They found that oestradiol caused a marked inhibition in intact rats, and a definite though less well marked effect in rats ovariectomized on the day after parturition. Testosterone propionate also caused pronounced inhibition, but progesterone and androsterone had no effect.

On the basis of these and similar findings it was suggested that oestrogenic hormones might be used for the inhibition of lactation in puerperal women, and numerous reports of this use of the naturally occurring oestrogens have appeared. Foss and Phillips (1938) obtained satisfactory results in 62 cases with oestradiol (progynon B, Schering), giving a total dose of 10,000 I.U. They found that oestrogenic hormone was also useful for flushed and engorged breasts, relieving the symptoms without interfering with lactation. Lehmann (1938) used progynon B oleosum. He found that 100,000 units given by injection in the first 24 hours post partum inhibited lactation in 91% of cases. Inhibition of established lactation was obtained in 89% of cases with 200,000 units, but in only 50% with 150,000 units. Jeffcoate (1939) gave oestrone by mouth in doses of 2 to 6 mg., gradually decreasing the dose over 3 to 6 days. He found that it was usually necessary to supplement this by 1 to 2 mg. of oestradiol benzoate by injection.

Literature of the Oestrogens

The synthetic oestrogenic substance diethyl-stilboestrol, commonly known as stilboestrol, was first described by Dodds, Golberg, Lawson, and Robinson (1938a). It has since been shown by numerous workers that this substance, and others chemically allied to it, are capable of reproducing the biological and clinical effects of the naturally occurring oestrogens. They can be produced relatively cheaply and are equally as potent when given by mouth as when injected, if not more so. Thus they stand in contrast to the naturally occurring oestrogens, which are generally very much less potent by mouth and are therefore best administered parenterally.

Reports on the use of stilboestrol to inhibit lactation have been published by different workers, including Winterton and MacGregor (1939), Wenner and Joël (1939), Mucklé (1940), Stewart and Pratt (1941), and Mendel, Goldman, and Caire (1941). All claimed satisfactory results in the inhibition of lactation, and some also found stilboestrol useful for engorged breasts. Mucklé stated that although initial success was achieved with 5 mg. 3 times daily for 2 days, the breasts filled up in 40% of his cases in 4 or 5 days and further treatment was necessary. Abarbanel and Goodfriend (1940) discovered, in a study of 315 lactating women, that doses up to 1,000 mg. were well tolerated. They also found that stilboestrol did not inhibit the onset of lactation, and, in doses of 500 mg., did not inhibit established lactation provided the stimulus of suckling was present.

Connally, Dann, Reese, and Douglass (1940) studied the effect of stilboestrol in 200 puerperal women, finding no toxic effect even with large doses. By clinical observation it was shown that the uterus responded to oxytocics more readily and involution was more complete at the 21st day than in a control group. The lochia were not altered. The morbidity rate in the treated cases was 4%, compared with 12.8% in the controls. These workers stated, however, that they were not in a position to recommend the routine administration of stilboestrol for the prevention of puerperal infection. They found that the onset of normal lactation was delayed in the cases receiving stilboestrol, but there were no cases of engorged or painful breasts among their patients.

It has been claimed by some authors that stilboestrol is a highly toxic substance. Mazer, Israel, and Ravetz (1941) reported that 52.4% of their patients vomited while receiving 2 mg. by injection every 4 days; when 2 mg. was given daily by mouth 21.3% vomited. These authors were unable to demonstrate any physical damage to their patients, but in rats and rabbits they found that a dose of 0.5 μg. per gramme of body weight caused necrosis of the liver, kidneys, and adrenals. These toxic effects have not been confirmed in pregnant and puerperal women, either in the present series or by other workers. In the present investigation no toxic effects were found beyond transient nausea in 3 patients. Pregnant and puerperal women, as will be shown, tolerate enormous doses of synthetic oestrogenic compounds—a tolerance which seems to be much greater than that of non-pregnant women.

Testosterone propionate has been used for the inhibition of lactation by Kurzrok and O'Connell (1938), Birnberg, Kurzrok, and Klor (1940), and Siegler and Silverstein (1940). The last-named authors consider that testosterone is better for this purpose than stilboestrol, claiming that stilboestrol causes afterpains and excessive lochia. This does not appear to be the experience of other workers who have used stilboestrol, and the results with testosterone were not, in general, so good as those with stilboestrol.

Triphenylchlorethylene is another synthetic substance that has been found to possess oestrogenic properties. Macpherson and Robertson (1939) demonstrated its oestrogenic properties, and also showed that it could be used for the inhibition of lactation. Of their 12 patients 6 received 4,000 mg. by mouth in 5 to 6 days: complete success was achieved in 4, while 2 had some discomfort in the breasts. The other 6 received 250 to 300 mg. by injection, and complete success was achieved in all of them.

* A Report to the Therapeutic Trials Committee of the Medical Research Council.

Present Investigation

This investigation was carried out at the request of the Therapeutic Trials Committee of the Medical Research Council, primarily in order to test the effects of the new synthetic oestrogen γδ-di-*p*-hydroxyphenyl-$\Delta^{\beta\delta}$-hexadiene, now known as "dienoestrol." The value of stilboestrol for the inhibition of lactation is now established, and it was therefore decided to compare the effect of stilboestrol and dienoestrol in patients in whom it was necessary to inhibit lactation. Trials were also carried out with the synthetic oestrogenic substance hexoestrol.

Hexoestrol, which is 4:4′-dihydroxy-γ:δ-diphenyl-N-hexane, was first prepared by Campbell, Dodds, and Lawson (1938). The biological effects of this compound were studied by Campbell, Dodds, Lawson, and Noble (1939), and it was considered to have oestrogenic properties similar to those of stilboestrol. The effect of hexoestrol on the uterus of the immature rat was found to equal that of stilboestrol, but in the ovariectomized rat its effect was greater than that of stilboestrol. Clinical trials were carried out with hexoestrol and stilboestrol dipropionate by Bishop *et al.* (1940). They found that these substances were similar in their oestrogenic properties, but the incidence of toxic effects was only 4.5% in patients receiving hexoestrol, while 21.6% of those receiving stilboestrol dipropionate showed symptoms of intolerance.

The chemical and physical properties of dienoestrol have been recorded by Dodds, Golberg, Lawson, and Robinson (1938b, 1939). Campbell, Dodds, Lawson, and Noble (1939), comparing the biological effects of stilboestrol, hexoestrol, and dienoestrol, found that when these substances were given by injection hexoestrol was the most actively oestrogenic and stilboestrol was more active than dienoestrol. Zuckerman (unpublished communication), working on monkeys, found that dienoestrol when given by injection appeared to be less potent than the naturally occurring oestrogens. Dienoestrol is, however, extremely potent when given by mouth. Emmens (1938) found that when this compound was given by mouth to mice it had the greatest activity, relative to subcutaneous dose, of any oestrogen examined up to that time. The present clinical trials have shown that dienoestrol, when given orally, is an extremely potent oestrogenic substance.

Clinical Results

The patients in whom it was necessary to inhibit lactation were mostly those in whom the foetus had been lost because of a stillbirth, abortion, or neonatal death. Lactation was sometimes inhibited for social reasons—e.g., in unmarried mothers who had to "foster" their children. In a few cases very sore breasts and severely cracked nipples made breast-feeding impossible. A case of hydatidiform mole evacuated at the end of the 20th week has been included in the series.

No other treatment was given. The breasts were not bound up, though in a few cases in which the breasts were sore or heavy a supporting brassière was worn. Fluids were given liberally and saline aperients were withheld, the only purgative used being liquid paraffin, supplemented where necessary by cascara.

Ultimate success with regard to lactation was achieved in all cases, though in some it was necessary to repeat the course of treatment. The treatment was not consistent in every instance, as the dose was varied in an attempt to find an optimum. In some cases, also, treatment was not begun until lactation was well established. An attempt to analyse the effect of these variables has been made. The course of treatment usually lasted 5 days, though sometimes it was prolonged for 6 or 7 days. The majority of patients received stilboestrol, and this was generally given in a total dosage of 30 mg., starting with 5 mg. twice daily and diminishing the dose by 1 mg. each day down to 1 mg. twice daily.

Of 134 patients in whom it was necessary to inhibit lactation 81 received stilboestrol, 37 dienoestrol, and 16 hexoestrol. The results with dienoestrol are apparently much less good than those with stilboestrol, but this is partly accounted for by the fact that the new substance was given only in very small doses at first, as its potency was not known.

The clinical results are tabulated below. It must be emphasized that "complete success" is claimed only in those cases in which there was a total absence of breast symptoms and signs as well as of lactation. Even in the remaining cases there were no severe symptoms, and in some there was only slight fullness of the breasts, lasting a day or two, or slight leakage of milk. The results are shown in Table I.

TABLE I

	No. of Cases	Complete Success	Breast Symptoms or Signs Present	Treatment Repeated
Stilboestrol	81	49	32	20
Dienoestrol	37	15	22	9
Hexoestrol	16	6	10	3

In the case of stilboestrol and dienoestrol the influence of the total dose given is seen in Table II.

TABLE II

Dose in First Course of Treatment	No. of Cases	Complete Success	Breast Symptoms or Signs Present	Treatment Repeated
Stilboestrol :				
30 mg. or less	59	35	24	19
More than 30 mg.	22	14	8	1
Dienoestrol :				
1 mg.	5	1	4	1
2–3 mg.	20	11	9	3
4–5 mg.	12	3	9	5

It was necessary to repeat the course of treatment in about a quarter of the patients, an interval of from 1 to 7 days being allowed between each course. Of the patients receiving dienoestrol and hexoestrol who required more than one course of treatment, all responded satisfactorily to the second course. Of the 20 patients receiving stilboestrol who required repeated treatment, 16 responded to the second course, but in 3 a third course was necessary, while one, who had had a miscarriage at 26 weeks, required a fourth course before lactation was finally inhibited.

So far as can be judged from this short series, there is a suggestion that the optimum total dose of dienoestrol is 2 to 3 mg. in 5 days: better results were obtained with these doses than with larger ones. The small dose tried at first—0.1 mg. twice daily for 5 days—was obviously inadequate. The most satisfactory results were obtained by starting with an initial dose of 0.5 mg. twice daily, and diminishing the dose by 0.1 mg. each day down to 0.1 mg. twice daily.

The influence of parity was also studied, with the results shown in Table III.

TABLE III

	No. of Cases	Complete Success	Breast Symptoms or Signs Present	Treatment Repeated
Stilboestrol :				
Primigravidae	40	28	12	12
Multigravidae	41	21	20	8
Dienoestrol :				
Primigravidae	26	6	20	8
Multigravidae	11	9	2	1
Hexoestrol :				
Primigravidae	11	2	9	2
Multigravidae	5	4	1	1

These results are conflicting, probably because of the comparatively small numbers. In primigravidae, however, it was more often necessary to repeat the treatment.

The effect of the duration of pregnancy is shown in Table IV.

TABLE IV

	No. of Cases	Complete Success	Breast Symptoms or Signs Present	Treatment Repeated
Stilboestrol :				
0–20 weeks	4	1	3	0
20–32 ,,	24	9	15	7
32–40 ,,	53	39	14	13
Dienoestrol :				
20–32 weeks	5	2	3	0
32–40 ,,	32	13	19	9
Hexoestrol :				
20–32 weeks	3	1	2	1
32–40 ,,	13	5	8	2

It was thus generally found easier to inhibit lactation in the later months of pregnancy.

Table V shows the results analysed according to the time of starting treatment after delivery. Eight cases are omitted from the figures for stilboestrol under this heading. In one of these 120,000 I.U. of benzoestrone had been given to help in the induction of labour after intra-uterine foetal death; a stillborn child was delivered, and a course of 30 mg. of stilboestrol was given with complete success as regards the inhibition of lactation. Two other cases, one of heart disease and pregnancy and the other of pulmonary tuberculosis and pregnancy, received 450 mg. and 390 mg. of stilboestrol, respectively, in an attempt to induce abortion. In the first case this failed, but on the day after abdominal hysterectomy it was necessary to give a further 50 mg. on account of painful breasts. The treatment was successful. The second patient passed the foetus after a bag had been inserted into the uterus. She also had painful breasts on the third day after operative removal of the placenta, but these cleared up in a few days with stilboestrol. The remaining 5 cases were of missed abortion or of intra-uterine foetal death. They received doses of stilboestrol ranging from 10 to 70 mg. before delivery. In one of these lactation was successfully inhibited with 31 mg. of stilboestrol post partum, and there were no breast symptoms. The remaining 4 had painful breasts after delivery, but all responded to further doses of stilboestrol, though in one case it was necessary to give two courses of treatment.

TABLE V

	No. of Cases	Complete Success	Breast Symptoms or Signs Present	Treatment Repeated
Stilboestrol :				
1st day	53	36	17	16
2nd to 7th day	15	10	5	2
After 7 days	5	2	3	0
Dienoestrol :				
1st day	27	11	16	7
2nd to 7th day	5	0	5	2
After 7 days	5	4	1	0
Hexoestrol :				
1st day	8	5	3	3
2nd to 7th day	6	1	5	0
After 7 days	2	0	2	0

The patient with the hydatidiform mole has been included in this series, as her breasts were very full and painful after evacuation of the mole. There was a good response to 50 mg. of stilboestrol, given over a period of 5 days.

Conclusions

To sum up, it may be stated that, in the respective doses given, stilboestrol was more effective than either hexoestrol or dienoestrol from the point of view of inhibition of lactation and its symptoms, though ultimate success was achieved in every case with all 3 substances. Dienoestrol was at first given in very small doses, in order to test its potency in comparison with that of stilboestrol, which had been in use for some months before treatment with the other substances was started. The optimum dose for treatment with stilboestrol was thus standardized, and so the results with the other substances suffer in comparison. The number of cases treated with hexoestrol was small, and here, too, the doses given at the beginning were experimental, and better results were obtained towards the end of the investigation. This may account to some extent for the disparity in the results given above.

When the influence of the number of pregnancies was studied the results were conflicting. A higher proportion of successes was obtained, especially with stilboestrol and hexoestrol, when treatment was started immediately after delivery, or on the first day of the puerperium, than later on. Symptoms occurred much more often when pregnancy ended before the 32nd week, and the most troublesome cases were those of miscarriage between the 20th and 28th weeks. When stilboestrol was given before delivery it was necessary to continue treatment afterwards, and in 6 out of 7 cases the breasts for a time became full and painful.

In addition to the foregoing investigation 3 patients who desired to continue lactation were treated for engorged breasts. One received 10 mg. of stilboestrol, one 2 mg. of dienoestrol, and one 12 mg. of hexoestrol. No other treatment was given, but suckling was continued. In all the cases the symptoms subsided within 48 hours and breast-feeding was thereafter normal.

Toxic Symptoms.—It was found that pregnant and puerperal women tolerated the synthetic oestrogenic substances by mouth extremely well. In one case 500 mg. in the aggregate and in another 450 mg. of stilboestrol were given with no toxic effects. Only one patient complained of nausea during treatment with stilboestrol. Two patients had nausea during treatment with dienoestrol. Both were receiving only 0.1 mg. twice daily. One was having sulphanilamide for puerperal pyrexia; the sulphanilamide was discontinued and the symptoms cleared up without interruption of the treatment with dienoestrol. The other patient complained of nausea on one day only, and this disappeared in spite of continuation of the treatment with dienoestrol. In no case was the lochial discharge excessive, so far as could be ascertained. Only 2 patients complained of after-pains. Both were multiparous women who stated that they had had after-pains following previous pregnancies, and they did not consider that their symptoms were any worse during the present confinement. The urine was albumin-free in 34 patients out of 38 in whom the urine was examined before discharge from hospital. The remaining 4 were cases of toxaemia, in which albuminuria persisted; but in no instance could this be attributed to the administration of the oestrogenic substance. Three cases of eclampsia were treated with dienoestrol—2 were free of albumin before discharge from hospital, and in the third there was only a trace of albumin on the tenth day.

Discussion

Before the discovery of these specific substances the standard method for the inhibition of lactation consisted in binding the breasts, restricting the fluid intake, and administering saline aperients. This method has several disadvantages. It is often not successful, and the patient has to endure painful engorged breasts for several days. The symptoms are commonly so severe as to necessitate the administration of analgesic drugs. Restriction of fluids is undesirable in a puerperal woman, and especially so if there is any urinary infection or if sulphonamide derivatives are being given. In the presence of perineal lacerations the administration of strong purgatives is undesirable.

The ideal treatment seems to be the administration of synthetic oestrogenic compounds. The treatment is cheap and is easily given; injections are not necessary and there are no serious toxic effects. The method is uniformly successful, provided an adequate dose is given, although occasionally complete relief is achieved only after repetition of the course of treatment. Success can also be attained with the naturally occurring oestrogens and with testosterone and its derivatives, but these substances have the disadvantages that they are expensive and must be given by injection. There appears to be little to choose between stilboestrol, hexoestrol, and dienoestrol, although in this series fewest breast symptoms occurred in the patients receiving stilboestrol. Hexoestrol has been claimed to be less toxic than stilboestrol, but as puerperal women tolerate stilboestrol so well the advantage of hexoestrol from this point of view is not apparent. In this series hexoestrol seemed to be less potent than stilboestrol when given in similar doses, but the number of patients receiving hexoestrol was small. Bigger doses might give better results. Dienoestrol is a very potent oestrogenic substance when given by mouth, and it is effective in about one-tenth the dosage required for stilboestrol and hexoestrol. This may well be an important factor when questions of expense are considered.

All 3 substances have been successfully used for the treatment of engorged breasts without interfering with lactation. The numbers in this series are small, but are sufficient to suggest that this may be a very valuable extension of the use of the drugs.

As regards dosage, with stilboestrol and hexoestrol the best scheme consists in giving large initial doses—5 mg. twice or thrice daily for 2 days—and then gradually diminishing doses for a further 3 or 4 days. This has a large initial oestrogenic effect, and the drug is gradually withdrawn. With dienoestrol one-tenth of the above dosage is generally sufficient, and, in fact, the best results in this small series were obtained with a total dosage of 3 mg. spread over 5 days.

To complete this investigation it was decided to try the effect of triphenylchlorethylene for the purpose of inhibiting lactation.

These trials are now in progress, and it is proposed to publish the results as a supplement to this paper at a later date.

Summary

The synthetic oestrogenic substances stilboestrol, dienoestrol, and hexoestrol were given orally to 134 patients in whom it was necessary to inhibit lactation: 81 received stilboestrol, 37 dienoestrol, and 16 hexoestrol.

Ultimate success with regard to lactation was obtained in all cases, though in some there were breast symptoms. Forty-nine of the patients receiving stilboestrol, 15 of those receiving dienoestrol, and 6 of those receiving hexoestrol were symptom-free. The symptoms complained of in the remainder amounted to no more than a slight fullness of the breasts or a temporary leakage of milk. These results stand in contrast to the older methods of treatment, with which very hard and painful breasts were often seen.

The results were better when treatment was begun within one day of delivery than when it was started later. They were also better in patients in whom pregnancy had advanced beyond 32 weeks than in those in the earlier months of pregnancy. Cases of pregnancy terminating at between 20 and 28 weeks were especially difficult to treat.

After stopping treatment on the fifth day the breasts filled up in about a quarter of the cases, and further treatment was necessary, but ultimate success was achieved in every case.

Three patients with engorged breasts were successfully treated for this condition while lactation continued normally.

In the dosage tried stilboestrol was more effective than hexoestrol. Dienoestrol is a very potent oestrogenic substance, and success was achieved with one-tenth of the dose required in the case of stilboestrol.

No ill effects from the treatment were noted, apart from complaints of transient nausea in 3 patients.

Synthetic oestrogenic substances are valuable for the inhibition of lactation and for the treatment of engorged breasts. They are cheap and effective, and are easily given by mouth.

The supplies of dienoestrol used in these tests were provided through the Therapeutic Trials Committee of the Medical Research Council by Messrs. Boots Pure Drug Co. Ltd., the British Drug Houses Ltd., and the Glaxo Laboratories Ltd. The British Drug Houses Ltd. also supplied the hexoestrol used.

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In an investigation into the significance of an abnormal electroencephalogram (e.e.g.), Denis Williams (*J. Neurol. Psychiat.*, 1941, **4**, 257) comes to the conclusion that an abnormal e.e.g. in an otherwise normal subject is strong evidence of an inborn constitutional abnormality involving the central nervous system. This abnormality appears to be non-specific, and may show itself in the subject or his offspring as a behaviour disturbance which may be psychoneurotic, psychopathic, psychotic, or epileptic in type. Williams estimates that 40% of epileptics have a normal e.e.g. between fits, but the incidence of the abnormality in epileptics showing more than one type of clinical fit was 90%.

A NEW ASPECT OF DRY PLEURISY

BY

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The class of patients under review is that of young adults who present themselves with a history of pleurisy, usually associated with general malaise, pain on breathing or coughing, often no family history of pulmonary tuberculosis, no sputum, and no abnormal physical signs in the chest except a pleural rub. The radiograph is as a rule within normal limits, and the question arises, What is the cause of the pleurisy and what is the correct treatment of the case?

On the assumption that this pleurisy is tuberculous, it is usual to advise a long convalescence, and then a routine examination of the patient over a period of 6 to 12 months or more, together with sputum examinations and serial radiographs at intervals. In view of our present knowledge this treatment is correct, but economically it is not always possible.

Recently the problem has arisen because the chairmen of the National Medical Service Boards have sent patients with dry pleurisy for an opinion on their chest condition. The question whether they are fit for service has to be considered, and, if they are, in what capacity or group, or whether they should be referred for a further period before a decision is made.

A small series of lipiodol radiographs of patients with pleurisy of uncertain origin has been made, introducing the oil into the affected side; in some cases slight but definite bronchiectasis was shown. It must be pointed out that there was no clinical evidence of bronchiectasis, such as cough, sputum, haemoptysis, or clubbing. Bronchiectasis may give rise to pleurisy, and it is well known that in the dry haemorrhagic type there are often no physical or radiological signs; it was this observation that led to the present investigation.

Bronchiectasis, by definition, means a dilatation of the bronchi. However, the clinical condition of "bronchiectasis" has been expanded to include a variety of allied states, of which the relatively common congenital cystic disease of the lung is a good example. The degree of dilatation does not matter; in the earliest cases the only finding is a demonstration on the bronchogram that the bronchi fail to narrow in their distal parts as they should. It is this minimal type of bronchiectasis that has been found in certain cases.

Lipiodol radiographs were carried out on 24 patients with a history of acute dry pleurisy. In 5 of them bronchiectasis of this slight degree was demonstrated, and in 2 of these the original radiograph suggested an infection of the lung in an area which was later shown to be bronchiectatic.

Case Reports

Case 1.—A man aged 21 presented himself with a history of slight cough and pain in the right side of the chest and right shoulder. The pain was worse on breathing and coughing. There was slight sputum which had no taste or smell, but no haemoptysis. At the onset of his illness he had profuse sweats

FIG. 1A

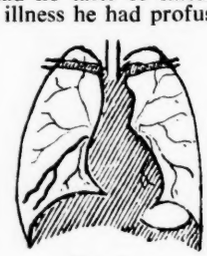

FIG. 1B

for one or two nights, but there was no record of his temperature. The physical signs in his chest were normal, and a radiograph showed a slight smudge at the right lower zone (Fig. 1A). Three days later he was radiographed again before lipiodol was introduced, and it was found that the opacity had vanished. The bronchogram showed that the bronchus supplying the right

middle lobe was of uniform diameter throughout its whole length (Fig. 1B). The original radiograph, together with the history of night sweats, cough, and pleuritic pain, made it clear that the patient had a low-grade inflammatory lesion of the lung, the remains of which had fortunately been detected radiologically before resolution was complete. It would seem that the area of inflammation in the lung had originated in the region of the weakened bronchus.

Case 2.—A man aged 26 complained of acute pain on the left side for 4 days that was pleuritic in character, together with cough and sputum for 2 days; during this time his temperature was not recorded. There were no abnormal physical signs in his chest, the sputum contained no tubercle bacilli, and a plain radiograph showed a slight haziness at the left base (Fig. 2A). *X*-ray screening a week later failed to reveal any abnormality at all. The lipiodol radiograph showed that the left lower lobe bronchus was slightly dilated throughout its length (Figs. 2B and 2C). The history and the original radiograph show that the patient had an inflammation of the left lower lobe of his lung, which resolved within a week, and that this had occurred around a damaged bronchus.

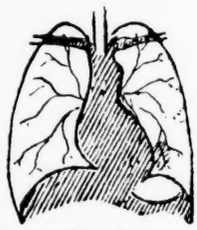

FIG. 2A

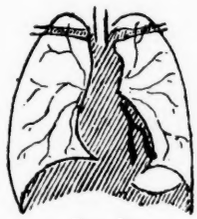

FIG. 2B

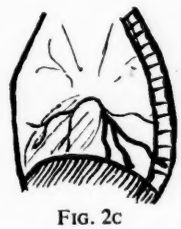

FIG. 2C

Case 3.—This patient, a man aged 25, complained of intermittent pain in the right side of the chest, worse on coughing, for the past six years, together with slight cough and lassitude. There was no family history of tuberculosis. The physical signs in his chest were normal, and his sputum contained no tubercle bacilli; a plain radiograph was normal, but a bronchogram revealed a considerable degree of tubular bronchiectasis of the right lower lobe (Figs. 3A and 3B).

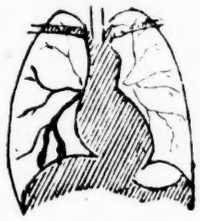

FIG. 3A

FIG. 3B

Case 4.—A man aged 47 first became ill in 1931, when he had acute pain in the right side of the chest, worse on breathing and coughing, associated with general malaise, pyrexia, and night sweats. This cleared up in about 2 weeks, but subsequently he had had 3 or 4 similar attacks, always on the right side, at intervals of 1 to 2 years. His last attack was in Dec., 1941, and at that time he had a pleural rub at the right base. A plain radiograph showed no abnormality, his sputum contained no tubercle bacilli, but a bronchogram revealed tubular bronchiectasis of the right lower lobe (Fig. 4).

Case 5.—The patient, a youth aged 19, had a history of general malaise and fever for 2 days, followed by cough and slight sputum. Four days after the onset of his illness he had

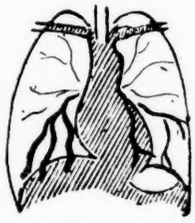

FIG. 4

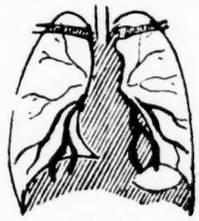

FIG. 5

had acute pain on the left side of his chest, worse on breathing and coughing, and because of this symptom he went to his doctor. In this case also there is no record of the temperature. He came to hospital a week after his illness, the pain having disappeared in the meantime. There were no abnormal physical signs in his chest, and a plain radiograph was normal. A lipiodol radiograph revealed bilateral tubular bronchiectasis (Fig. 5).

Discussion

The series is small, and therefore the results might be misleading if represented as a percentage, but they do suggest the advisability of a routine bronchogram in cases of pleurisy of obscure origin. In those cases in which bronchiectasis can be demonstrated there is little doubt that the pleurisy is due to a low-grade infection of the lung around a damaged bronchus, because in Cases 1 and 2 the original radiograph revealed such an area of infection, which subsequently resolved in a few days, and it is reasonable to suppose that this may have been present in the other cases.

This aetiological factor is of importance because of the subsequent treatment. These patients do not need a long convalescence, nor do they need serial radiographs; and they are fit for service in the Forces—if not in Grade I, certainly in a lower grade. It is sometimes stated that the risk of a tuberculous infection in cases of bronchiectasis is greater than in normal people, but there is no doubt that this complication is by no means common.

The treatment of these patients can be divided into two stages—during the acute attack and between the attacks. In the acute stage, warmth, strapping, and relief of the cough usually clear up the pleurisy. Between the attacks the patient's general health is built up by a full diet and vitamins, and efforts are made to prevent reinfection. Thus upper respiratory tract infection is removed when possible, and the patient is advised not to frequent crowded places, because of the increased risk of picking up a respiratory infection. Most of these measures can be carried out in the Services.

As the figures show, inflammation around a damaged bronchus does not account for all the cases of dry pleurisy with negative physical signs and radiographs, but it does determine the aetiology of a proportion of them. The remainder should still be treated as tuberculous in origin; otherwise cases of pulmonary tuberculosis will be missed. Therefore a lipiodol radiograph is an important investigation in cases of dry pleurisy.

Summary

The aetiology of dry pleurisy occurring in young adults, without other physical or radiological signs, is discussed. Lipiodol was introduced in 24 patients, 5 of whom showed bronchiectasis, and in 2 of these evidence of infection was seen around the dilated bronchus.

The treatment of dry pleurisy due to infection of the lung about a bronchiectatic area is described and the importance of separating this group of cases discussed.

VITAMIN B_1 IN THE URINE AND PLACENTA IN TOXAEMIA OF PREGNANCY

BY

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Fulminating beriberi is a rare complication of pregnancy in this country. It is possible that subcritical—a term which we prefer to subclinical—states of avitaminosis B_1 do exist among some pregnant women. In Hong Kong there is a poor Chinese population in which avitaminosis B_1 is endemic. Early in pregnancy such women complained of cramps, pins-and-needles, fatigue, and oedema, just as our women do. Westenbrink and Goudsmit (1938) have shown that women of the poor part of Amsterdam—wives of unemployed—had a higher incidence of these symptoms than their non-pregnant sisters or pregnant women of the better class. Analysis of their diet showed that the food intake was much less, especially as regards brown bread.

Williams and his co-workers (1940) in Philadelphia undertook a nutrition survey, purely from the vitamin B_1 aspect, of 500 pregnant women. Of those investigated, one-third were not receiving an adequate amount of vitamin B_1 (15 I.U. per 100 calories). Among those with an inadequate intake, 30% vomited and had nausea, fatigue, paraesthesiae, cramps, and dyspnoea.

Some workers have suggested that there is an association between the protean manifestations of toxaemia of pregnancy and a deficiency of vitamin B_1. Siddall (1938), working in South China, observed the combination of toxaemia and beriberi in ante-natal cases. He advanced the theory that only when an adequate supply of vitamin B_1 was available was the normal function of the pituitary gland possible. He believes that in pregnancy a deficiency of this vitamin leads to an over-compensation or malignant hyperfunction of the gland. In time this produces all the manifestations of toxaemia, with increase of prolan and decrease in oestrin. Jasumami (1938) found a higher incidence of toxaemia amongst the poorer classes, and the administration of vitamin B_1 was effective in severe pre-eclamptic cases. Vignes (1935) attempted to correlate the hepatic changes in vitamin B_1 deficiency and toxaemia. In the deficiency cases he noted the diminution in volume of the liver and the decreased amount of glycogen in this organ and in the muscular tissues. In both toxaemia and avitaminosis B_1 there was perverted carbohydrate metabolism.

In the last obstetric report that has reached this country from Prof. Gordon King (1941) in Hong Kong there are some interesting tabled cases of eclampsia and avitaminosis B_1. A study of these reveals the fact that the severer the degree of toxaemia the higher the incidence of avitaminosis B_1, with concomitant increased mortality. There were 42 cases of eclampsia, and 19 (45%) of these were complicated by avitaminosis B_1. Of the 13 deaths 11 also had this complication. Thus in 85% of eclampsia deaths there was the double lesion of eclampsia and avitaminosis B_1.

Present Investigation

The subjects of our study were from the maternity departments of St. Mary Abbots and Paddington Hospitals (L.C.C.), and consisted of a series of women varying in age, parity, and maturity. Forty-six had clinically normal and 60 clinically abnormal pregnancies. The 60 cases classed as abnormal were made up of: hyperemesis, 6; hypertension, 28; pre-eclampsia, 3; eclampsia, 2 (7*); oedema, 14.

It was decided to base the assessment of the patients' state of vitamin B_1 nutrition on the 24-hour urinary excretion of the vitamin, the collection beginning on their admission to hospital. The vitamin B_1 content of the placenta of certain of these patients was also examined.

Method of Assessment.—The samples of urine were poured into large glass bottles, previously prepared by the addition of a few drops of toluene and hydrochloric acid to prevent loss of the vitamin on standing. As soon as possible, usually within a few hours, the specimen was prepared for assay. At this time the routine examination of urinary samples done in the laboratory was by the cure of induced bradycardia in rats, and this method was used for the whole investigation. To prepare the sample for feeding to the B_1-deficient rats the vitamin was adsorbed on to a fine acid clay. A small quantity of clay was added to the urine and agitated in a mechanical shaker for 20 minutes. The adsorption was always done at *p*H 4.5. Previous experience had shown that one adsorption could be relied upon to remove only part of the vitamin from a sample of urine, so for each patient the adsorption was repeated. Two grammes of acid clay was used for each process, and the adsorbate collected by filtration and dried. After drying, the two lots of acid clay from each urine were intimately mixed and weighed into the doses for feeding purposes. Preliminary trials soon showed that for the particular work in hand 2 g. of acid clay for each adsorption gave satisfactory results. The duration of cure produced by this adsorbate was compared with the cure produced by graded levels of the standard substance which was being fed regularly each fortnight in the colony. During the first part of the investigation this standard substance was also a sample of acid clay as issued by the department of vitamin standards of the Medical Research Council, but when the new vitamin B_1 hydrochloride standard was introduced the latter came into use. Each fortnight a group of 18 animals was given the standard substance, in 3 groups of 6 animals at each dose level. One sample of urinary adsorbate gave 6 doses at one level.

Examination of the responses obtained from the rats receiving the doses of international standard showed that throughout the experiment the dosage–response curve did not vary significantly in slope or position; it was therefore legitimate to group all these figures together before using them to assess the vitamin B_1 value of the samples of acid clay adsorbate from the individual urines.

The estimated amounts of vitamin B_1 excreted during the 24 hours are shown individually (on a logarithmic scale) in Fig. 1

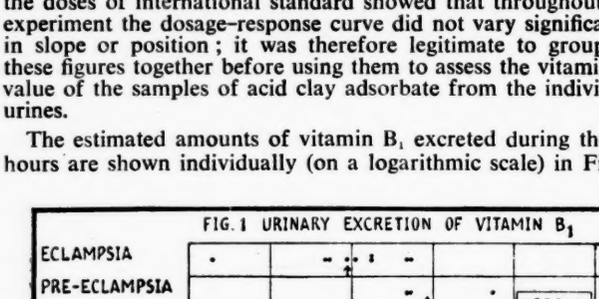

FIG. 1 URINARY EXCRETION OF VITAMIN B_1

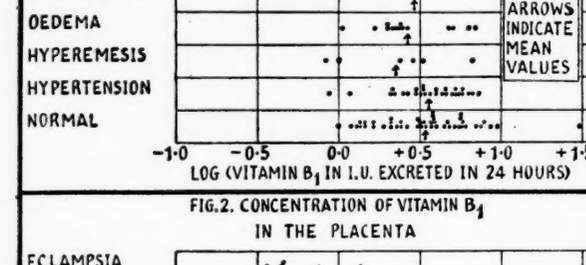

FIG. 2. CONCENTRATION OF VITAMIN B_1 IN THE PLACENTA

and summarized in Table I. Even among subjects classified as normal, the excretion averaged under 4 units; the only clinical group to show a significant difference from the normal group was that of the eclamptic patients. The significance of this particular difference is at once apparent when we examine Fig. 1, since in each of the 9 eclamptic cases the excretion was less than the normal average; applying Student's t-test to the logarithmic values, we find that the odds are many thousands to one against the observed difference being due to chance.

TABLE I.—*Urinary Concentrates*

Clinical Group	No. of Cases	Mean Log (B_1)	Corresponding Level of B_1 (I.U.)	Value of t
Normal	46	0·531	3·39	—
Hypertension	28	0·553	3·58	0·39
Hyperemesis	6	0·352	2·25	1·52
Oedema	14	0·425	2·66	1·28
Pre-eclampsia ..	3	0·458	2·86	0·46
Eclampsia	9	−0·026	0·94	5·61

Note.—The values of t given in the last column are those appropriate to testing separately the significance of the differences between the group means and the mean in the normal group. They are based on 100 degrees of freedom.

The influence of various other factors on the urinary excretion of vitamin B_1 was investigated. The following points were considered: age, marital status, number of previous pregnancies, number of weeks before term at which the specimen was collected, and weight of the infant at birth. In none of these cases was there any significant correlation between the circumstance examined and the vitamin B_1 excretion.

Concentration of Vitamin B_1 in the Placenta

The placentae from 56 patients were examined; most of these patients had already supplied specimens of urine for the study summarized above, but as we were unable to find a significant correlation in individual patients between the amount of vitamin

* On a preliminary statistical examination (in the early part of 1941) of the results, there appeared to be strong evidence in favour of the hypothesis that eclampsia was closely correlated with severe vitamin B_1 deficiency. With a view to testing this further, material from other eclamptic cases was sought, and 7 additional patients were studied—4 by the courtesy of Mr. Hector MacLennan, Royal Maternity Hospital, Glasgow, and 3 by the courtesy of Dr. Eric Stacey, Jessop Hospital, Sheffield. The total number of eclamptic cases is therefore 9.

B_1 excreted and the data subsequently recorded for the placenta these data are here summarized independently.

The placentae were collected as soon as possible after labour and weighed without cord and membranes. The fresh tissue was then fed direct to rats, usually 6 for each placenta, at a dose level of 7½ g. a rat. The concentrations of vitamin B_1 in the placenta were then estimated as described above. The resulting figures are plotted, again on a logarithmic scale, in Fig. 2, and summarized together with the weights in Table II. Although there was no significant correlation between the weight of the individual placenta and the concentration of vitamin B_1 in it, in both cases, as with the urinary excretion of the vitamin, the average readings for the group of eclamptic patients are very significantly below those for the normal group. The t-test shows that the odds against the chance occurrence of differences as large as those observed are many thousands to one in the case of the placenta weights, and millions to one in the case of the vitamin B_1 concentrations.

None of the other clinical groups differs very significantly from the normal in its vitamin B_1 concentration; a difference as large as that recorded between the average placenta weights in the pre-eclamptic and normal groups would occur by chance on rather less than 1 in 40 occasions, but since the scatter of the mean weights in the first 4 clinical groups is not nearly so exceptional we prefer not to stress this particular contrast. A similar remark applies to the difference between the average vitamin B_1 concentrations in the oedema and normal groups.

TABLE II.—*Placentae*

Clinical Group	No. of Cases	B_1 per 100 g. of Placenta			Mean Placenta Wt.	
		Mean Log.	Corr. B_1 (I.U.)	t	g.	t
Normal ..	34	1·288	19·4	—	539	—
Hypertension	8	1·297	19·8	0·17	542	0·02
Oedema ..	2	1·508	32·2	2·19	367*	1·34
Pre-eclampsia	7	1·329	21·3	0·72	429	2·32
Eclampsia ..	5	0·772	5·9	7·81	274	5·54

* 1 case only.

Note.—The values of t given above are those appropriate to testing separately the significance of the differences between the group means and the mean in the normal group. They are based on 50 degrees of freedom.

Summary

A series of 106 cases of pregnancy among hospital populations has been examined.

It was found (1) that in eclampsia the amount of vitamin B_1 excreted in the urine on admission to hospital is significantly lower than in normal pregnancy; and (2) that the concentration of vitamin B_1 in the placenta is also significantly below that of the placenta from normal cases.

In view of these findings and the occurrence of oedema and suppression of urine in eclampsia, offering a striking similarity to the clinical picture of beriberi, it is suggested that vitamin B_1 therapy might be beneficial to such patients.

We wish to thank Dr. Allen Daley, Chief Medical Officer of the L.C.C., for granting us the facilities for this investigation and for permission to publish its results.

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J. G. Strohm (*Urol. cutan. Rev.*, 1941, **45**, 770), who records his observations on 429 cases of carcinoma of the prostate in various hospitals in Portland (Oregon), states that one-fifth of the male patients who seek relief for obstruction of the vesical neck have this disease. In the majority of cases growth begins in the posterior lobe. Skeletal metastases are found in the pelvis, sacrum, lumbar vertebrae, femur, and dorsal spine, in the order named. Bilateral sciatica is almost indicative of cancer of the prostate, and even unilateral sciatica should be regarded with suspicion. The two most typical symptoms are frequency and difficulty of micturition. The age of Strohm's cases ranged from 17 to 92. Treatment by female hormones relieved the pain of bone metastases to some extent.

SUBARACHNOID HAEMORRHAGE IN IDENTICAL TWINS

BY

JOHN G. O'BRIEN, M.B., B.Ch., B.A.O.

The well-known similarity of physical characteristics in identical twins and the nature of their origin suggest that they should be liable to the same diseases. In particular, those pathological processes which depend on congenital anomalies of structure, such as bicuspid aortic valve or lack of tunica media at arterial junctions, might be expected to affect both rather than one of a pair of uniovular twins. Examples of this must of course be rare, and no instance of subarachnoid haemorrhage has been reported, so far as I have been able to ascertain. The case of an identical twin treated for this condition in the East Suffolk Hospital, Ipswich, aroused particular interest because of this possibility, and I consider it worth putting on record, despite the interval that has elapsed. On inquiry it was found that his twin brother had died some years earlier in very suggestive circumstances. As there are rather unusual features about the case it is perhaps advisable to give the history in full.

Clinical and Pathological Record

The patient was employed by a Suffolk farmer pulling sugar beet. He is said to have been an excellent worker, cheerful and intelligent, and never to have complained in any way. On November 26, 1938, he was found lying in an empty house, and, according to the relieving officer who saw him, there was a history of inebriation the previous day. His condition was ascribed to this, coupled with cold and exposure. On admission to the local infirmary he was found to be in an exhausted condition but conscious. He was extremely quiet, but complained of severe headache. The temperature was 99.4°, the pulse 68, and the respirations 26. There was no apparent paralysis—a negative observation which is important in view of subsequent findings.

Next day limpness of the left arm was noticed and headache still continued to be severe. Heavy albuminuria occurred on the third day, and transfer to the East Suffolk Hospital was arranged. He was admitted under Dr. Ronald Jones on November 29. When seen the patient was very drowsy and speech was slurring. The nurse who had accompanied him stated that the drowsiness had been increasing gradually. The following were the findings on examination: head retracted and rotated to the left, immobility of left arm and leg, twitching of left leg, rigidity of neck, pupils equal and reactive, disks flat, left facial weakness of upper neurone type, tongue deviated to left on protrusion, abdominal reflexes absent, limb reflexes absent, positive Babinski on left. There were hypotonia of the limbs, more marked on the left, and relative anaesthesia of the left side as a whole. Lumbar puncture revealed a uniformly blood-stained fluid at a pressure of over 400 mm. and, on centrifuging, the specimen yielded a yellow supernatant fluid. The blood pressure was 165/90.

Subarachnoid haemorrhage was diagnosed and daily lumbar punctures were started. The cerebrospinal fluid became free of visible blood in a fortnight, its pressure fell to 220 mm. and the colour became deep yellow. The patient began to take an interest in his surroundings, though slight headache and head retraction still remained. The paralysis was unchanged. Improvement continued for a further fortnight, when the fluid was a translucent yellow and the manometric reading 200 mm.

Apart from the left hemiplegia, the case up to this point had followed a comparatively normal course. Hemiplegic symptoms, however, are not uncommon in subarachnoid haemorrhage. There is no reason to suppose that, had no other condition supervened, the patient would not have survived and ultimately recovered some degree of power in his leg and possibly his arm. On the following day, however, he was prostrated with violent headache and pyrexia of 101° F. The C.S.F. pressure rose to over 400 mm. and the fluid itself became turbid. It yielded meningococci in culture, and gave a positive meningococcal pre-

cipitin reaction. No other case of cerebrospinal fever occurred in the hospital during the period immediately before and after this infection. Despite treatment, death occurred a week afterwards. On one occasion *B. coli* was found in a specimen, but as this finding was not repeated despite careful search and culture it may be regarded as a contaminant.

Post-mortem Findings.—A necropsy performed by Dr. E. Biddle, pathologist, revealed a very interesting condition. The brain was congested and oedematous, with thick pus over the base. In the middle of the right hemisphere beneath the Rolandic area was a haemorrhagic cyst about 4 cm. in diameter, with a pigmented wall. The contained blood was, however, only about three to seven days old. Near the origin of the left middle cerebral artery was a thrombosed aneurysm about 1 cm. in diameter, and adhesions and pigmentation in the surrounding tissues pointed to leakage. Dr. Biddle suggested that a rise in blood pressure consequent on the original subarachnoid haemorrhage caused rupture of a branch of the right middle cerebral artery. This supposition explains the history of the headache and drowsiness with collapse antedating the onset of paralysis by about twenty-four hours. It is unfortunate that in this initial phase a lumbar puncture was not performed, as blood in the C.S.F. at this stage would have indicated an uncomplicated subarachnoid haemorrhage. It may be noted that the localized effusion was in the position in which apoplectic haemorrhages usually occur. No atheromatous or arteriosclerotic changes in the vessels were observed. The apparent age of the blood in the cyst might have been due to an addition to its contents during the period of increased pressure after the onset of meningitis. The findings in this case may afford a clue to some cases of hemiplegia following rupture of a congenital intracranial aneurysm.

The Case of the Twin

It was found on inquiry that the deceased's twin brother had been of similar weight, height, and appearance when alive. He had died eight years previously while on holiday. After a breakfast at 9 a.m., which he seemed to enjoy, he proceeded to the tennis court with his wife. While playing he complained of severe headache and retired to bed. He either dozed or was unconscious during the afternoon. In the evening, after taking some brandy, he became violently sick, and death occurred next morning. For some unknown reason a doctor was not called in until after death, and a necropsy was not performed.

The sudden onset of headache during exertion in a previously healthy adult of 26, followed by coma, and ending in death within twenty-four hours (plus a bout of vomiting, which might, however, have been due to the brandy), might almost be considered pathognomonic of subarachnoid haemorrhage. The following is the relevant extract from the "Register of Deaths" regarding the case: "Natural causes—brain condition either that of brain abscess ruptured into a ventricle or spontaneous haemorrhage of a congenital flaw in a brain artery."

It will be noted that ruptured brain abscess is given pride of place. No primary condition such as otitis media or sinusitis which might give origin to an abscess is mentioned, however, and the deceased's father states that he had been in good health before the catastrophe occurred. It must also be remembered that the certifying doctor did not see the patient until after death. The weight of evidence would seem to favour the "flaw in a brain artery," though in the absence of a necropsy there cannot, of course, be any absolute assurance on the point.

Discussion

The occurrence of subarachnoid haemorrhage in identical twins raises the interesting possibility of surgical intervention in the case of the second or surviving twin, based on the post-mortem findings on the first. The combination must be so rare, however, that this will probably remain a matter of purely speculative interest. In connexion with the case as described there are a few points of interest which have not yet been discussed. The heavy albuminuria noted on the third day is an occasional occurrence in subarachnoid haemorrhage and does not necessarily indicate a renal origin of the vascular condition. It might be mentioned that glycosuria may also occur and give rise to an erroneous diagnosis of diabetes.

The treatment of this condition has not yet been standardized, and the repeated lumbar punctures carried out in treating the present case would, in all probability, not receive unqualified approbation. Daily punctures were performed until the fluid became free of visible blood, in the belief that (1) they tend to interrupt the vicious circle of haemorrhage → cerebral anaemia → rise in blood pressure → more haemorrhage; (2) they reduce the total fibrinogen in the C.S.F., and any replacement from the normal source reduces it relatively, with a resultant diminished danger of clot formation. The movement of fluid resulting from lumbar puncture also helps in this direction. One of the complications of the condition is clotting of the edges of a haemorrhage effused over the vertex, with the formation of a "pancake haematoma" in the centre of which bleeding is still taking place, with pressure on the cerebral hemisphere and possibly hemiplegia. Spinal drainage will not relieve this once the condition is established. (3) They afford symptomatic relief.

In connexion with the vicious circle referred to, it might be of advantage to recount the sequence of events in intracranial haemorrhage as pictured by physiologists, more especially as it is also the basis of the explanation suggested by Dr. Biddle. The brain, with its membranes, blood vessels, and C.S.F., completely fills the cranium. If the volume of this latter is encroached upon by the addition of free blood (or any other space-occupying mass) pressure is exerted on all the contents. Of these, the blood vessels alone have free and direct exit for their contents, and so bear the brunt of the compression. The blood available to the nervous tissue is thus directly squeezed out, and, moreover, circulation through the brain is hindered somewhat as the passage of water through a soft rubber hose is hindered by pressure with one's foot. The net result is a cerebral anaemia with an accumulation of CO_2 which stimulates the vasomotor centre to activity and thus raises the blood pressure. This will tend to increase the bleeding and initiate the sequence again. The process if unchecked may go on to paralysis of the vital centres and death.

The removal of C.S.F. eases the strain on the circulation by reducing intracranial tension and thus tends to interrupt the vicious sequence. There is of course a danger that reduction of the C.S.F. to any marked extent before the circulation has adjusted itself to the improved conditions may increase the strain on any clot which has formed at the rent in the vessel wall, and perhaps dislodge it. The importance of this is a moot point, and is open to discussion. Obviously the more slowly the fluid is withdrawn the less likely is this catastrophe to occur.

In the case under discussion rupture of a congenital aneurysm was probably the first event. It is suggested that rupture of an intracerebral vessel, perhaps the "artery of haemorrhage," occurred about twenty-four hours afterwards, with production of hemiplegia. This was in the situation in which rupture occurs in hypertension, and was probably due to a rise in blood pressure following on the subarachnoid haemorrhage. Hemiplegia was already apparent when the lumbar punctures were begun, and thereafter a gradual improvement set in until meningitis supervened. Should this suggested sequence have been the actual train of events there is a distinct possibility that lumbar puncture in the initial phase might have prevented the secondary rupture and hemiplegia.

The only fact which does not fit in with this hypothesis is the apparent age of the blood in the cavity. This, as already suggested, might have been added to the cyst during the course of the meningitis. The alternative is that the

cyst was formed during the meningitis and was entirely unrelated to the hemiplegia, the occurrence of which would then be unexplained. As for the infection itself, one can only regard it as a fortuitous event which proved to be the last straw for the patient.

The occurrence of these three clinical entities—subarachnoid haemorrhage, intracerebral haemorrhage, and meningitis—in any one patient is such a rare event that it is interesting to speculate what the odds against their happening in an identical twin are—an astronomical figure, surely! That the case should have occurred at all is an example of the interesting possibilities that sometimes materialize during the course of medical practice.

I should like to express my thanks to Dr. Ronald Jones for permission to publish this case as well as for his criticism and advice, and to Dr. Eric Biddle for the use of his post-mortem notes on the subject.

UREA AND ITS EFFECT ON TUBERCLE BACILLI

BY

Prof. S. L. CUMMINS, C.B., C.M.G., M.D.

Urea has been shown to have a marked beneficial effect in the treatment of septic wounds as well as to possess certain physiological properties in regard to proteins. Spiro has been quoted in relation to the latter, but I have not been able to have access to his paper, dated 1900. Ramsden, in 1902, showed that it acted as a "*substance sensibilisatrice*," rendering proteins more prone to zymolysis, conversion into acid- or alkali-albumin; as a protective substance, since coagulable proteins are not heat-coagulable in its presence but reacquire their coagulability when the urea is removed by dialysis; and as a solvent. He added that "in a saturated urea solution no putrefaction ever takes place."

Symmers and Kirk (1915) made a powerful claim for treatment of septic processes by crystalline urea. Kirk, after giving striking examples of its successful application, pointed out, however, that the wounds should be kept tightly closed by covering the urea with some dry protective material such as oiled silk or by suturing, as a "dry dressing on top of the urea absorbed the solution and prevented its action on the tissues." Symmers, dealing with the problem from the bacteriological point of view, showed that strong concentrations of urea were bactericidal and bacteriostatic. He showed, further, that urea would kill bacteria in the presence of blood and other protein substances.

One of Symmers's experiments—a very striking one—may, however, have given rise to some misunderstanding and deserves to be carefully considered. He took two tubes of tuberculous sputum. To one of these he added urea and the other he left as a control. From the tube treated with urea a culture was made after 15 minutes from which only 3 colonies grew. From a further culture put up after 30 minutes there was only one colony. From the control tube there was abundant growth on agar. Anyone reading this account in a hurry might imagine that it was intended to convey that tubercle bacilli had been killed, but this was not the fact or the intention. The tuberculous sputum had been chosen because it afforded a good example of a badly contaminated sputum. Its culture after 15 minutes and half an hour showed that the urea had sterilized it or at least had gone very far towards sterilizing it in a very short space of time, whereas a culture from the control sputum gave an abundant growth on agar. The experiment was not intended to prove the sterilizing effect of urea on tubercle bacilli, but to show its effect on putrefactive organisms.

The Experiment

It occurred to me, therefore, to try the effect of urea on the tubercle bacillus itself as exemplified by a pure culture. Two cultures were obtained from Prof. W. H. Tytler of the Welsh National School of Medicine. One of these failed to grow either with or without urea, and was therefore put aside as useless for the tests. The other, labelled "Pleural Fluid 22924" and dated Nov. 8, 1941, was emulsified in sterile water to a dilution of about 5,000 million bacilli per c.cm., the number being judged by the opacity of the fluid but not counted.

On Dec. 30, 1941, in each of 4 sterile test-tubes was placed 1 c.cm. of this suspension of tubercle bacilli, urea being added as follows:

Tube I:	Sat. sol. urea	1 c.cm. of tubercle suspension
,, II:	,, ,, ,, /2	1 ,, ,, ,,
,, III:	,, ,, ,, /4	1 ,, ,, ,,
,, IV:	,, ,, ,, /8	1 ,, ,, ,,

At the same time 1 c.cm. of tubercle suspension was put up with 1 c.cm. of distilled water, two test-tubes being thus suspended so as to have two "controls."

All 6 tubes were then transferred to the incubator at 37° C. and left for 48 hours. At the end of this time each tube was removed and 0.5 c.cm. of the contents placed on a "bottle" of Löwenstein-Jensen medium, the screw cover being well fixed and the bottles placed in the incubator at an angle close to the horizontal. After a week they were replaced vertically, the surface being dry.

On Feb. 9, 1942, the culture tubes were examined and found to show growth of tubercle bacilli as follows:

Tube I:	Sat. sol. urea ..	T.B. susp. ..	No growth
,, II:	,, ,, ,, /2 ..	,, ,, ..	,,
,, III:	,, ,, ,, /4 ..	,, ,, ..	−
,, IV:	,, ,, ,, /8 ..	,, ,, ..	+ +
Control:	Aq. dest.	,, ,, ..	+
,,	,, ,, ...	,, ,, ..	+ +

It should be recalled that the saturated solution of urea had been diluted in each tube by an equal volume of bacillary tubercle suspension, so that the final cultures were made with half the strength in each tube.

Conclusions

The experiment shows that urea in dilutions of half saturation and one-fourth saturation completely kills off the tubercle bacilli from a thick emulsion in 48 hours. In an eighth and a sixteenth dilution, however, it is powerless to kill, though it is significant that the growth was much less on Tube III than on Tube IV. The phenomenon seems to be just the same as that noticed by W. J. Wilson (1906) with coliform and other bacteria.

Seeing that urea either in the pure state or in saturated solution is harmless to the tissues and that it not only kills tubercle bacilli in very large numbers but also destroys septic secretions and ordinary saprophytes as well as pathogenic germs, it would appear very suitable as a dressing for tuberculous ulcers and even, perhaps, for cavities close to the pleural surface where adhesions have made these accessible or small tuberculous empyemata. In the treatment of tuberculous ulcers, however, where the crystalline urea was being used, it should be protected from absorption by the dressings by the interposition of oiled silk or some similar material between the urea and the dressings.

It is to be noted that Stonham (1941) reported favourably on urea in the treatment of septic wounds and that Muldavin and Holtzmann (1938) obtained with it excellent results in infected cases.

Good accounts of the physiological and therapeutical uses of this substance may be found in articles by Gurchot and McCawley (1940) and Holder and MacKay (1939).

My best thanks are due to Prof. W. H. Tytler for the culture used, and to Lieut.-Col. A. S. M. Winder, R.A.M.C., and Sgt. C. Neill, R.A.M.C., for much kind assistance.

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Medical Memoranda

Cardiac Massage for Heart Failure under Spinal Anaesthesia

In view of Mr. Hamilton Bailey's article in the *Journal* of July 19, 1941 (p. 84) we think the following case is worthy of record.

CASE REPORT

A youth aged 19 was admitted on July 22, 1941, for operation for recurrent appendicitis. A spinal anaesthetic (12 c.cm. of 1 in 1,500 percaine) was administered. After the abdomen was opened it was noticed that the patient showed grey cyanosis of the face; the pulse could not be felt at wrist or temple. A finger on the aorta confirmed the cessation of circulation. The operator immediately enlarged the gridiron incision and inserted his right hand under the left dome of the diaphragm, putting his left hand on the praecordium. By this time the circulation must have been stopped for about 2 minutes. Rapid and firm squeezing of the heart from below the diaphragm was not effective in restarting the circulation, so after about 45 seconds of this procedure an intracardiac injection of adrenaline (10 minims of 1 in 1,000) into the third left intercostal space at the left edge of the sternum was given. The rapid and firm squeezing of the heart was continued, and about 20 seconds later it began to beat at an almost uncountable rate. Immediately after this, artificial respiration was started by the assistant, while the anaesthetist kept the airway clear and administered CO_2 and oxygen intrathecally. Respiration was slow in being re-established, and after a pause in the artificial respiration the contractions became weaker and more rapid.

After the heart had restarted contracting, artificial respiration had to be carried on for about 45 minutes before respiration became regular and automatic, and it had to be continuous in order to maintain the pulse rate at about 120, any relaxation resulting in a quickening of the pulse rate and a reduction in its volume. The hand carrying out the cardiac massage was kept under the diaphragm throughout the period of artificial respiration, the surgeon and the assistant taking turns in carrying out artificial respiration and keeping the hand under the diaphragm.

The operation was concluded successfully, and except for the fact that there was every sign of cerebral oedema for the first 48 hours, the patient made an uneventful recovery and is now carrying on his usual employment.

COMMENTARY

As Mr. Hamilton Bailey points out, team-work is most essential in cardiac massage. Each member of the team must have a preconceived idea as to his or her exact duties in such emergencies. This is well borne out in the present case: one kept the hand in the abdomen, another carried on with the artificial respiration; the anaesthetist kept the airway clear and administered CO_2 and oxygen, while the theatre sister had the cardiac injection ready drawn up in a syringe. It is difficult to assess the importance of any one of these procedures in resuscitating the patient. It is quite evident that cardiac massage without artificial respiration would have been ineffective in maintaining the circulation. We must therefore stress the advisability of persisting with artificial respiration until such time as the respirations are automatic and regular and the pulse rate is normal and of good volume. It seems, however, that it was more than coincidence that the heart began to beat about 20 seconds after the intracardiac injection.

The following points are of great importance: (1) There should be a preconceived plan for every member of the theatre staff. (2) Cardiac massage should be started at once by the surgeon. It may be necessary to persevere with this until cardiac action is regular and forceful. As this is a tiresome process the assistant may have to relieve the surgeon. (3) A cardiac injection should be administered as soon as possible: the injection should be ready in the syringe before the operation. (4) Directly the heart has started to beat, artificial respiration should be begun and persevered with. It may be necessary to continue this for a long time, but speed is most important at the beginning.

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Reviews

ORTHOPAEDIC AND INDUSTRIAL SURGERY

The 1941 Year Book of Industrial and Orthopedic Surgery. Edited by Charles F. Painter, M.D. (Pp. 432. $3.00 or 16s. 6d.) Chicago: The Year Book Publishers; London: H. K. Lewis. 1942.

An hors-d'œuvre may be appetizing and exciting, but it does not take the place of a meal. Similarly the *1941 Year Book of Orthopedic Surgery* stimulates without satisfying the reader's appetite. Interest is provoked. One is inspired to dip here and there, but not perhaps to devote the thought and attention which the reviewed work merits. It is nevertheless salutary for surgeons who read their journals with care to realize how much they have overlooked.

The subject-matter ranges from details of the treatment of war wounds of the limbs and gunshot fractures of long bones to the influence of oestrogen on callus formation; from the treatment of hard and soft corns of the foot to the significance of the accessory foot bones; from a working classification of arthritis of the joints to resection of the obturator nerve for arthritis deformans of the hip-joint. Every detail of the technique of internal meniscotomy is described, including many which are not generally acceptable, such as the use of local anaesthesia and air injection on the seventh day. An authors' index facilitates reference to the work of Mixter and Barr on the retropulsed disk, Wallace Cole on claw-foot, Clay Ray Murray on the timing of fracture healing, Frank Ober on fasciotomy for sciatica, and Le Mesurier on the operative correction of scoliosis. The report of the American Academy of Orthopedic Surgeons on fracture of the neck of the femur is included. Reviews are not limited to contributions of American origin; they include the work of James Mennell on massage, Harry Platt on external popliteal nerve lesions, Ll. Griffiths on Volkmann's contracture, and Putti on the interarticular joints of the spine.

Industrial medicine is reviewed in 57 pages. The reader learns of lead hazards in printing, the danger of electric arc welding, and the industrial aspects of hernia; he is instructed in protective equipment for the eyes, the first-aid management of fractures of the spine, the penetration of tissues with Diesel oil, and the problem of tuberculosis in industry.

This book faithfully records the progress of orthopaedic and industrial surgery in 1941 and has all the attributes of an encyclopaedia. Unlike most encyclopaedias, it can be carried in the hip-pocket and read in trains; alternatively, it can be held in the hand of the surgeon who reads himself to sleep.

ANATOMY TAUGHT BY HAND

The Principles of Anatomy as Seen in the Hand. By Frederic Wood Jones, D.Sc., F.R.S., F.R.C.S. Second edition. (Pp. 417; illustrated. 25s.) London: Baillière, Tindall and Cox. 1941.

Prof. Wood Jones's works are always stimulating and instructive. The second edition of *The Principles of Anatomy as Seen in the Hand* fully sustains his previous reputation of being an authoritative teacher and astute observer. His capacity for interpreting the bearing of apparently trivial anatomical facts upon medical practice is a characteristic feature of his writings, and this work embodies much of the matured experience gained by him during a life spent in some of the zoologically most interesting quarters of the globe. This second edition is enriched by much new material, of which we may specially mention his account of the supposed additional radial digit, or pseudo-pollex, of the giant panda. Incidentally this peculiarity affords an admirable illustration of "Dollo's law of the irreversibility of structural evolution," which when more fully stated means that evolution, while frequently reversible as a result of environmental conditions and adaptation, is irreversible with respect to animal structure. In the giant panda, which "comes of a pronograde stock and walks on all fours," the first metacarpal is firmly fixed in a parallel series with the remaining metacarpals and is therefore unapposable. The false thumb of the giant panda has arisen in response to a demand for a grasping element, and is formed by enlargement, with increased mobility, of a radial element of the carpus, accompanied by adaptive shifting of muscles and tendons. Another example of indepen-

dent parallel development, in response to demands of function, is illustrated by the author in his description of the "toilet digits" in the feet of Tarsius, a primate, and of Dromicia, a marsupial; these specialized digits have sharp curved claws which are used for combing and scratching the hair and skin. Notwithstanding wide structural differences in type between these two animals, there is a striking similarity of the specialized second and third digits of the feet, and also in the arrangement of the pressure pads. Yet another example of parallel evolution is furnished by the author—namely, the development of papillary ridges on the hairless sensitive surface of the tip of the prehensile tail of the spider monkeys; these ridges serve to increase the hold of the tail, and contain papillae, which are provided with touch corpuscles.

Prof. Wood Jones, however, does not always impart his information in a light and humorous vein; there is plenty of serious matter of technical interest, which to be appreciated must be read in the author's own words.

YEARBOOK OF PATHOLOGY

The 1941 Year Book of Pathology and Immunology. Pathology: edited by Howard T. Karsner, M.D. Immunology: edited by Sanford B. Hooker, M.D. (Pp. 623. 16s. 6d.) Chicago: The Year Book Publishers; London: H. K. Lewis.

The *Year Book of Pathology* for 1941 edited by Karsner on the pathological side and Hooker on the bacteriological, contains many hundreds of well-classified summaries, the majority brief, but a few extending to several pages and a considerable number illustrated. The large mass of condensed information so provided is certain to be of value to anyone, for the net is cast so wide that even the most assiduous reader of journals must find much that is new to him. An enormous number of unrelated subjects are dealt with, and many readers might prefer a more comprehensive review of progress in a smaller number of subjects, but to extend this policy far would alter the whole purpose of such a publication. There are, nevertheless, large groups of summaries dealing particularly with studies in which notable progress has been made in the United States itself which will attract particular attention. Among infections, poliomyelitis, pneumonia, and influenza are allotted considerable space, and a curiosity to us, the histoplasmosis of Darling, is the subject of several papers included. Cancer is dealt with from many aspects, and a full summary is given of Sir Robert Muir's recent paper on the evolution of carcinoma of the breast. There is much about blood groups, the nature of viruses, gramicidin and other antiseptics of bacterial origin, and, among more recondite matters, electrophoretic studies and the use of the electron microscope. No one ambitious to keep abreast of pathological research in its multitudinous aspects can afford to be without this volume.

Notes on Books

Mr. HAROLD BURROWS has prepared an eleventh edition of his little book *Surgical Instruments and Appliances*, which first made its appearance as long ago as 1905. In a brief preface the author states that he has tried to keep abreast of developments in surgical technique, and several of the older illustrations have been replaced so as to display newer types of surgical apparatus. The publishers are Faber and Faber and the price is now 3s. 6d.

To-day for the first time the magnificence and beauty of St. Paul's is revealed as it was originally intended—but at what a cost! Itself a memorial to another great fire, it is also a reminder of opportunities lost, for it was designed as the focus of a new London. Mr. RALPH TUBBS in his *Living in Cities* (Penguin Books, 1s.), while insisting that the chance must not be missed again, realizes that we shall have the same difficulties as in the time of Wren—divided authority, vested interests, and the urgency for speed—and shall need both faith and trust, as well as preparation now. His plea is by no means confined to London. The rapid industrialization of the nineteenth century took our fathers unawares, so that just when growing science could have planned better our cities became smothered in slums. Nor is this age guiltless, for assuredly more of the countryside was ruined between the wars than in any commensurate period. The necessary relationship between environment and healthy life has been intensively studied for plants and animals, but this science of oecology is in its infancy so far as human beings are concerned. The book is illustrated by striking photographs, but the diagrams are on too small a scale to be really helpful. The author draws a fascinating picture of what is possible, and we can only add, "So mote it be."

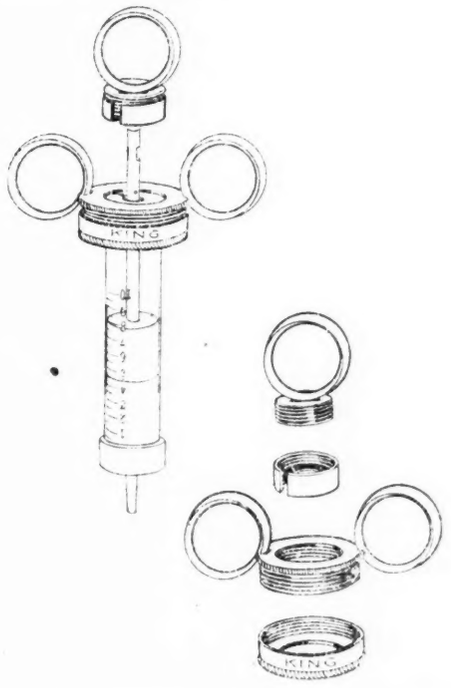
A Doctor in Paradise, by S. M. LAMBERT, M.D., is published at 16s. by J. M. Dent and Sons. The romance of medicine can have few better exponents than Dr. Lambert, who was sent by the Rockefeller Foundation's International Health Board in 1920 to the South Sea Islands, or, as he calls it, 6,000,000 miles of island-sprinked sea. His previous experience of tropical medicine was gained in Costa Rica and Mexico. At that time ankylostomiasis (hookworm disease) was so widespread a scourge that it had only one rival—malaria. Twenty years later hookworm had practically vanished—a striking testimony to Dr. Lambert's unwearying management of the campaign against it. The author threw himself into the study of native customs, and guided the islanders with sympathetic intelligence to a higher standard of social well-being. He had to contend with the ravages wrought by venereal disease, tuberculosis, dysentery, and pneumonia, carried to these non-immune natives by visitors, sailors, and traders. Before he left (when his eyesight had almost failed) he had established a Central Medical School at Suva, from which native medical practitioners have gone forth to ail the South Sea Islands. The book is delightfully written: it is exciting and interesting and does not have a dull page from beginning to end. In addition it contains much practical information on tropical medicine.

Preparations and Appliances

SYRINGE ADAPTER FOR REGIONAL ANAESTHESIA

Dr. NORMAN REYNOLDS JAMES writes:

The ever-growing shortage of syringes suitable for regional anaesthesia, such as the Labat or Lundy types, and the difficulty and delay now experienced in effecting repairs, prompted me to devise a simple method whereby any standard 10-c.cm. Record



syringe could be converted to suit those who are accustomed to using finger grips.

The drawings here reproduced illustrate the simplicity of the device. A collar, to which rings for the index and second fingers are attached, fits over the syringe cap and is secured by a screwed flange. A thumb ring is similarly attached to the plunger head by a two-piece screwed fitting. No alternative has been provided for the bayonet needle lock, but an effective junction can be made with either type of needle if attached with a firm twisting motion.

The device is obtainable from A. Charles King, Ltd., 27, Devonshire Street, London, W.1.

BRITISH MEDICAL JOURNAL
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MORALE ON THE HOME FRONT

The war has jerked into prominence enormous questions regarding our social economy. Some of these were formerly the concern of the few; others are fresh, or at least are being looked at in a new light and setting. Total war reminds us vividly that we did not before 1939 have total peace, and that peace abroad did not mean that we were free from strife at home. The struggle for survival demands an internal harmony that peace did not seem to require. It is a paradox that war should ask of the community as a whole a greater efficiency than it imposes upon itself for the purposes of peace; and that while our attitude and behaviour abroad are at their fiercest, at home the need for a sweet reasonableness and for better relations between individuals and groups becomes imperative. In this country recent effort has been concentrated on organizing the output of machines, the war having been conceived more and more as essentially a war of machines. But no sooner is one principle grasped than another becomes obvious. It is now being realized, as Mr. Tom Harrisson points out in his latest "Mass Observation" report on British war production,[1] that it is the man (and, increasingly, the woman) who makes the machines that is the factor upon whom in the long run all depends.

The German attributed his defeat in the last war primarily to a breakdown in morale. He regards war as fundamentally a contest in morale, and, as was shown in the brilliant survey by Wing Commander R. D. Gillespie published in the *Journal* of April 4, our enemy has by his own methods organized morale as he has organized everything else.[2] In this country, either as part of a deliberate policy or from preoccupation with other matters, little attempt has been made so far to consider morale from a wide national point of view as a problem in itself. Reliance has apparently been placed to a large extent upon the traditional sources of morale in the British people, and these have once again proved their worth. There have, it is true, been sporadic endeavours to help morale when certain specific situations have arisen—e.g., as a result of bombing—but are such *ad hoc* measures enough? "Mass Observation's" survey of British war production, while reassuring in a number of ways, shows that although there are numerous indications of more effective action in helping morale in individual groups and throughout the country generally, it has been felt by many, and it seems to be made clear by this report, that not all that might be done in this way is being done. This reflection is strengthened when we contemplate the fact that the conditions of the uneasy peace at home before 1939 did not always, to say the least, cement and strengthen the foundations of traditional British morale. A member of Parliament in a recent speech as noble as it was charming expressed this when he said, "To-day we live in a very exalted frame of mind." After referring to the Special Areas he went on to say, "I sometimes think that it is a marvellous thing that in those particular areas somehow or other by a veritable miracle the sense of faith and loyalty to the nation and belief in things that matter have survived." Out of the mouths of babes and M.P.s the truth sometimes comes.

The fighting Services have their own ways of attending to morale. Civilians do not have the benefit of corporate life in fighting-formations of historic fame, yet they are themselves almost as important a part of the front as any. This inquiry by "Mass Observation," which started with the investigation of industrial efficiency, shows at how many points morale on the home front is capable of being influenced for good or ill by general policies as well as by local conditions. The effects of the disorganization of civilian life by evacuation, conscription, and the like; of bad relations between employers and employees; of the lack of propaganda explaining military and political needs; of the methods of presentation of news; of the lack of a coherent and consistent plan for industrial production instead of a programme of spurts for aeroplanes, or tanks, or guns, as the case may be, leading to the absence of a sense of policy and purpose; of the failure to convey a feeling of belonging to one vast community of effort in a common cause; and of confusion, for example, in the campaign for the recruiting of women—all these and many other points are elucidated and documented in this comprehensive report.

To the medical man there are many sections of special interest. Here are some of the topics this report offers as a challenge to doctors, not simply as individuals but in their organized representational groups: the need for day nurseries with so many mothers in industry; the effects of fatigue on output and the optimum weekly number of working hours; the use of the C3 man in industry; accident-proneness in some individuals; the effects of adequate nutrition; and above all the need to consider man-power in terms not of so many "bodies" but of individuals. The fundamental problems are psychological. In the case of the individual worker this means, for example, the effect of alterations in the circumstances of life, especially among women drafted into industry. The report stresses particularly the women's dislike of being moved at the discretion of some governing body from one part of the country to another. One is reminded of the classic by Geddes and Thomson on the *Evolution of Sex*, in which the contrast is made between the relatively anabolic immobile ovum and the highly katabolic free-swimming male element. Differences between man and woman in action and reaction, based on differences in physiology and psychology, must be taken into account by the administrator—too often, unfortunately, untrained in biology. But for the whole mass of workers, what is of first importance, if war production is to reach its maximum efficiency, is the recognition that neither man nor woman is "a purely economic and mechanical animal." These considerations are vital. If a worker is treated as an economic unit or as a cog in a machine he will very soon react in human fashion, by protesting his humanity in a hundred and one ways—by idling at the machine, by watching the clock during the last half-hour of a shift, by developing aches, pains, coughs, colds, by temperamental reaction—and, eternally, by grumbling.

This report, in spite of some evidences of "ideological" bias, deserves, and demands in the interests of victory, the most careful study by authorities of all kinds as well as by individuals such as doctors, social workers, managers of concerns large and small, and leaders of labour. Production output depends, as the report shows, on the whole atmosphere, energy, and morale of the country—and morale in the last analysis depends on the enthusiasm, the ideals, the health, and the contentment of the individual.

[1] *An Inquiry into British War Production.* Part I: People in Production. An Advertising Service Guild Report prepared by Mass Observation. (10s.)
[2] *German Psychological Warfare.* Published by the American Committee for National Morale.

HORMONAL CONTROL OF LACTATION

The problems involved in the hormonal control of lactation are extremely complex, and researches now in progress, while adding to our knowledge of the factors at work, have not led to the postulation of any all-embracing or coherent theory. Ample evidence for this statement is given in the comprehensive review by Folley,[1] to whose work we referred in a leading article on lactation in July of last year. At the moment the chief interest in this country is focused on the actions of oestrogens and pituitary fractions and their relations. It is by now well established that mammary development may be incited in most mammals by combined treatment with an oestrogen and progesterone. In general, oestrogens appear to stimulate duct development and progesterone appears to be responsible for alveolar growth. There is no clear-cut evidence that these actions are direct, for experiments in hypophysectomized animals have given conflicting results in the hands of different workers. In this connexion Speert[2] performed an interesting experiment by painting the left nipples of immature male monkeys with an alcoholic solution of oestrone, the right nipples being painted with alcohol alone. He found that the oestrone-treated mammae enlarged while the control right nipples were unaffected, which goes to show that the pituitary was not involved. This conclusion, however, at present applies only to the mammary glands of the immature male monkey, because one of the most confusing factors in research on lactation has been the quite different results obtained by similar procedures in different species and in the different sexes of the same species. The technique of unilateral inunction does, however, provide a method for testing the direct action of hormones absorbed through the skin without removing the animal's own glands, which inevitably results in undesirable and usually uncontrollable secondary effects.

Turning to the question of the secretion of milk by the mammary glands when they are fully developed, the pituitary is found to be accepted as the most important factor at work. It is perhaps unfortunate that the early researches of Riddle showed that anterior pituitary extracts which initiate lactation in a variety of species would also cause the growth of crop-glands in the pigeon. This was made the basis of an assay method for preparations and was almost universally adopted. It is only lately that it has been appreciated that this method of assay has distinct disadvantages. It is now realized that an extract capable of stimulating the pigeon's crop-gland does not necessarily initiate milk secretion in mammals. The commercial preparations of prolactin at present available are usually standardized by the crop-gland response, a fact which may account for conflicting clinical reports. Folley[1] therefore proposes that the name "prolactin" should be confined to crop-stimulating activity, and Folley and Young[3] suggest the term "galactopoietic factor" for the anterior pituitary fraction responsible for increasing the milk yield of an animal already producing milk. "Lactogenic" is applied to the initiation of lactation in hypophysectomized animals. Folley and Young in their experiments showed that injections of crude anterior pituitary extracts increase the milk yield in cows in declining lactation to a greater extent than do purer preparations containing seven times as much prolactin (crop-stimulating) activity. This leaves open the question whether prolactin is galactopoietic, but proves that there is a distinct galactopoietic factor in the pituitary apart from a prolactin, or a principle which, acting with prolactin, has a synergistic galactopoietic effect. The present difficulty of applying experimental findings to clinical problems is neatly summed up in a widely quoted dictum of these authors: "There appears to us no reason why a woman whose milk supply is deficient should be considered more closely analogous to the hypophysectomized guinea-pig or the intact pigeon than to the cow in declining lactation."

The most recent developments in this field are connected with the action of oestrogens on milk secretion. Folley and his colleagues have initiated copious lactation in virgin goats and heifers by inunction of stilboestrol ointment to their udders. So far only preliminary reports[4] of these findings have been published. They may at first sight cause surprise, as oestrogens have been clinically used for some time to inhibit lactation; in fact a report of the use of synthetic oestrogens for such a purpose appears in this issue of the *Journal* (p. 601). The doses required for such inhibition are, however, large, and there is little doubt that the effect is due to depression of pituitary function. In comparison, the doses used by Folley are small and are applied locally, and he suggests[5] that small doses of oestrogens stimulate the pituitary. This seems very likely; there is analogous evidence concerning secretion of gonadotrophin; small doses of oestrogen apparently stimulate the secretion of luteinizing hormone, while large doses cause atrophy of the gonads by suppressing gonadotrophin secretion. This work on the incitement of virgin goats to yield milk has been extended by Folley and Young,[6] who now show that the lactation brought about by stilboestrol inunction may be much enhanced by injections of crude anterior pituitary (galactopoietic) extracts. The milk yield is comparable with the peak yield expected in a normal lactation period, and the quality of the milk (content of fat, non-fatty solids, and lactose, and nitrogen partition) is also normal. This experiment therefore mimics the course of events in normal lactation: the mammary glands are first built up by the oestrogen, and later, presumably through pituitary stimulation, milk secretion is initiated.

The more detailed descriptions of this work will be awaited with interest and also its repercussions in the field of laboratory experiment: it is obvious that much thought and experimentation will be required to fit these facts into the already bewildered mass of laboratory data. If milk secretion can be provoked by similar means in animals with multiple and separated mammary glands, the part played by the pituitary and/or other endocrine glands could perhaps be more fully determined by unilateral inunction.

1 *Biol. Rev.*, 1940, **15**, 421.
2 *Science*, 1940, **92**, 461.
3 *J. Endocrinol.*, 1940, **2**, 226.
4 *J. Physiol.*, 1940, **98**, 15 P; ibid., 1941, **100**, 7 P.
5 *Lancet*, 1941, **1**, 40.
6 *Nature*, 1941, **148**, 563.

BYWAYS IN TUBERCULOSIS

No bacteriologist has ever devoted himself more patiently and completely to the study of a single disease than the late A. Stanley Griffith. In tuberculosis most things happen many times more slowly than in other infections, whether in the culture tube, the laboratory animal, or, indeed, in many human cases. An experiment starting with what seems an adequate number of animals may prove months later to be a comparative failure owing to deaths from other causes. Observations in cattle must last even longer, and here expense becomes a limiting factor. Patience is thus indispensable in the study of this disease, and the greater part of a lifetime was not too long for all that Griffith did. The issue of the *Journal of Hygiene* for November, 1941, contains six posthumous papers by him, of which only one is stated to have been received for publication before the date of his death; the remainder were not submitted until months later, and may conceivably

have been completed by another hand from his records. These papers illustrate the wide diversity of his work within what may seem the narrow ambit of a single infection. The keynote of this series is exploration among untried animal species. The last and briefest—consisting of less than ten times as many words as its title, which must surely be a record—recommends the use of the common toad as a repository for strains of tubercle bacilli which are to be preserved. The toad is easily kept in confinement, is not subject to spontaneous infections, and if inoculated with tubercle bacilli maintains them in its liver without suffering ill effects for as long as three years. It is also recorded that the grass snake is susceptible to infection with avian tubercle bacilli, as well as to strains from other reptiles. One object of studying the disease in a variety of animals is to discover new methods of typing. Although the great majority of tubercle bacilli isolated from human cases can be assigned to either the human or the bovine type, usually by their cultural characters, or, if not, at least by their pathogenicity for the rabbit, occasional strains are found which present great difficulty. Two such strains are described in detail in one of these papers—one isolated from the meninges of a woman and the other from a lumbar abscess in a boy. Griffith also possessed a number of strains isolated from Nigerian natives, all of which possessed anomalous characters. All these were taken to the appeal court of the field vole, an animal in which bovine strains cause generalized and progressive tuberculosis with caseating lesions, whereas human strains, whether eugonic or dysgonic, produce no macroscopic lesions elsewhere than at the site of the inoculation. Unfortunately the common rule that things which are atypical in one way will also be so in others proved to be applicable here: the results of vole inoculation were widely various and provided no answer. Whether this form of experiment will serve also to distinguish bovine strains which may have lost virulence for the rabbit by habituation to human or equine tissues is another question which remains unanswered. The two remaining papers describe the pathogenicity of various types of tubercle bacilli for the golden hamster, and the effects of intravenous and intramammary injections of large amounts of B.C.G. in the goat. The object of these experiments was to decide whether vaccination with B.C.G. may lead to the appearance of living bacilli in the milk: this is a possible consequence of the use of living vaccines which Griffith himself brought to light more than thirty years ago. These experiments in goats were actually made some years ago, and their importance is much diminished by the observation made by A. Q. Wells, and confirmed by Griffith himself and Dalling last year,[1] that the vole bacillus is apparently a far better immunizing agent than B.C.G. The extensive trial in cattle of a living vaccine made from this organism is one of the most important tasks which await the veterinary bacteriologist in better times, if, indeed, it could not be proceeded with even to-day.

MEDICAL DISCONTENTS IN FRANCE

We get little news of our colleagues in Occupied France, but an outspoken article in *L'Œuvre* of April 19 gives some idea of their general plight and tells of particular grievances. The discontent of the medical profession, it says, cannot be denied, for this comes to light in all private conversations between doctors. Many Members of the Council of the Order—except for a few young men somewhat prematurely appointed to it and won over from the start to the methods of the iron fist and favouring authoritarian decisions—view with some disquiet the overthrow of professional traditions which were a guarantee for the patient as well as for the doctor. (The Council of the Order is the nearest French equivalent of the G.M.C.) After observing that there is no art in which long experience is more necessary before coming to a decision, *L'Œuvre* says that the decrees which Vichy produces each day by the dozen, replacing unwritten laws, are exceptionally hard on the medical profession. More and more new tasks are being imposed upon the doctor, and his independence and his possessions are ceaselessly diminishing. When, for example, the petrol ration has to be cut the authorities take care not to meddle with the black market, or with the rations of private cars, which still take women and children for rides in Paris; but the cars of the country doctors are the first to suffer. Again, the obligatory contributions for family allowances are thrice as much for the medical profession as for any other, and the State subsidizes all funds except medical funds. Why, *L'Œuvre* asks, this exception? Meanwhile the doctor in Occupied France has to shoulder many more thankless and unpaid duties than ever before. Medical certificates are perpetually in demand—certificates for the diet of his patients, which have to be renewed every month in duplicate or triplicate, for the wood and coal rations of old people, for the layettes of newborn babies, and for those who wish to take the waters. (Are we free from this plague of forms in Unoccupied England?) When the French doctor comes home tired out after long walks and the climbing of innumerable staircases of the Métro, and finally after climbing his own stairs—for he has to do without a lift—he finds awaiting him a load of clerical work in filling up reams of certificates. It is he also who is responsible for carrying out prophylactic measures against infectious disease and for keeping up to date the statistics in the Health Department of the Préfecture. That is all in the day's hard work, but to it has been added a new source of discontent. The doctor is now asked to notify to the Health Department his patients suffering from venereal disease. The whole medical profession, says *L'Œuvre*, has risen in arms over this point, such a request to denounce one's patients being in fundamental opposition to the principle of professional secrecy. The article ends with this question: Is medicine still a liberal profession, or is it to become a form of civil service?

THE BED BUG

Surveys have shown that in some districts in our cities nearly all the houses are infested with bugs. Even vigorous and enlightened policies by public health authorities in the direction of bug eradication have yielded disappointing results; and it has often been reported that these parasites have invaded modern dwellings constructed in recent years. A committee appointed by the Ministry of Health reported in 1934 that there were many gaps in our knowledge of the fundamental biology of the bed bug, and the work of C. G. Johnson, financed by the Medical Research Council, was directed to give a fuller knowledge of the life and habits of this insect. Temperature and food supply are the two factors having the most important effects on the bed-bug population. No accurate data were found to exist for the microclimatic conditions in houses in this country, and figures had therefore to be obtained for different types of dwelling; these figures are summarized in Dr. Johnson's paper.[1] In later sections of the paper these climatic data are related to the biology of *Cimex lectularius*. The effects of temperature, humidity, and frequency of feeding are worked out in much detail, but the medical man will be more interested in the conclusions contained in the latter section of the paper.

[1] See *British Medical Journal*, 1941, **1**, 717.

[1] *J. Hyg.*, Camb., 1941, **41**, 345.

A discussion of the effects of the climatic and other conditions on a hypothetical population of bugs reveals that in the ordinary unheated bedroom in England only a small number of adults and later nymphal stages are likely to survive the winter, and though this may increase much during the summer and autumn the effects of the cooler weather of the next winter should be enough to reduce the population to approximately the same level as it was in the previous spring. On the other hand, in a bed-sitting-room which is usually heated activity will continue for a much larger part of the year, and under these conditions very much bigger bug populations will be built up. This reveals how dangerous an infestation in a modern centrally heated building might become—a conclusion with which Continental medical officers are already fully conversant.

The question most frequently asked of the entomologist by the medical officer of health is: "How long must bug-infested premises be left unoccupied before the insects will all die out?" Dr. Johnson does not answer this question specifically, but his data allow us to form an estimate. Under the most favourable conditions no bug survived longer than 533 days, and it is doubtful whether, during the latter part of its life, it could have either fed or reproduced. It is unlikely under conditions obtaining in an English house that bugs would survive for longer than one year, and it would be safe to assume that in eighteen months a house would be completely free from infestation. When the weather is cool, however, fertilized bugs regularly survive starvation for six months and start laying fertile eggs as soon as the temperature rises. Bugs normally starve during the winter, but in summer, when they are active, they are much less able to survive without food. The possibility that, in the absence of man, the parasites might maintain themselves on rodents or birds infesting the house cannot be ignored, but the behaviour of the insects is such that it seems unlikely that a population could be kept alive for long in this manner. When bugs appear in numbers in a house which has been unoccupied for some time, it is usually not because they have survived but because they are migrating from adjoining inhabited premises.

There are still many questions to be solved before the bed bug can be completely eradicated from this country; Dr. Johnson's investigation has given us many of the data which will be necessary for the final solution of the problem.

PULMONARY CAVITATION

Not the least puzzling aspect of cavities in the lungs is the mechanism by which they close. That the closure of a tuberculous cavity is accompanied by changes in its draining bronchus was noted by Williams[1] and others at the end of last century, and in a recent series of papers Coryllos, in an attempt to explain these changes, asserts that obliteration of the draining bronchus must occur before a cavity can close. Price Thomas[2] has enlarged on this. He holds that the very early cavity, produced by rupture of a tuberculous focus into a bronchus, will close as a result of the inherent retractility of the lung provided that there is free bronchial drainage and enough healthy lung around the cavity to allow compensatory emphysema to occur. Persistence of such a cavity may be due either to continued ulceration, or to the pull of the chest wall, or to the inflationary effect of the bronchial air stream, which Thomas considers to be by far the most important. He suggests that the tuberculous process causes a partial stenosis of the draining bronchus so that air is trapped in the cavity and prevents closure; thus the majority of tuberculous cavities are tension cavities from their inception. As the disease progresses free bronchial drainage often becomes established, but by this time the affected area is usually adherent to the parietes and the pull of the chest wall prevents the cavity from closing. At this stage obliteration of the cavity can still be brought about by occlusion of the bronchi which drain it, for this will lead to absorption of the air within it, as shown by Coryllos and more recently by Auerbach,[3] who found in a series of post-mortem examinations that cavity closure was always associated with closure of the draining bronchus. Interesting confirmation of these views is provided by the recent observations of Winn[4] of the behaviour of pulmonary cavities due to coccidioidal infection. These cavities are analogous to tuberculous ones, as both are caused by a granulomatous process. Winn found that their persistence was associated with free bronchial communication, and in one instance he demonstrated bronchographically a stenosis of the draining bronchus which was followed by closure of the cavity. According to Thomas, therapeutic measures such as rest in bed, artificial pneumothorax, diaphragmatic paralysis, and thoracoplasty cause tuberculous cavities to close by promoting occlusion of their draining bronchi. They do so by diminishing the inspiratory tug on the bronchial walls, and, in the case of relaxation methods, by reducing the calibre of the bronchi, thus converting a partial into a complete stenosis. The author discusses in detail the application of these principles to each method of treatment.

Whether the mechanisms described in his paper represent the complete explanation of the closure of tuberculous cavities is a matter for further discussion and experiment, but the great value of the work is that it provides a reasonable hypothesis upon which treatment can be based. As Thomas points out, the occasional survival of a patient in spite of cavitation does not diminish the fact that a persistent tuberculous cavity menaces its possessor as well as the public at large. Procrastination has no place in the treatment of pulmonary tuberculosis, and the physician should not allow subjective improvement to lull him into the easy pursuance of a waiting policy when the *x*-ray film gives objective evidence of an early or persistent cavity. In this, as in other forms of warfare, the best defence is to attack. Success can be achieved only if the campaign is carefully planned with due regard to all the available information about the nature and probable behaviour of the enemy. The days are past when the introduction of air into the pleural cavity and the interruption of the phrenic nerve were regarded as mysterious rituals whereby a cure could sometimes be brought about. The time has come when the old conception of such measures as ends in themselves must be discarded in favour of a rational plan of treatment based on mechanical principles.

We regret to announce the death at his home near Lewes of Dr. H. Russell Andrews, consulting obstetric physician to the London Hospital.

By an amendment of the Public Health Act Nova Scotia will become the first Canadian Province to institute compulsory examination and treatment of persons suspected of suffering from venereal disease. The Bill gives medical health officers authority to examine any suspected persons "with or without their consent" and treat them until it is certified that "the danger of infection to other persons no longer exists."

1 *Pulmonary Consumption*, by C. J. B. Williams and C. T. Williams, 1887, London, Longmans, Green & Co.
2 *Brit. J. Tuberc.*, 1942, **36**, 4.
3 *J. thorac. Surg.*, 1941, **11**, 21.
4 *Arch. intern. Med.*, 1941, **68**, 1179.

War Surgery of the Extremities

This is one of a short series of articles based on lectures given at the British Postgraduate Medical School, Hammersmith

TREATMENT OF WAR WOUNDS AND FRACTURES

BY

J. TRUETA, M.D.

The special features of modern warfare, and particularly the wide use of the aerial bomb, have introduced a great diversity in the type of war wounds, while the new strategy of air attack on the civil population has necessitated fresh arrangements for the reception and treatment of casualties. The organization of the surgical services must be adapted to the requirements of the varying conditions, but the actual treatment of any war wound—whatever the nature or scene of the battle in which it was received—should always be based on certain fundamental biological principles.

A Five-point Programme

The biological treatment of wounds (if we may so call it) rests on five basic principles. To ensure the greatest possible success in treating a recently inflicted wound, each and all of these five principles or "points," as we shall term them, should be applied. They are: (1) prompt surgical treatment; (2) cleansing of the wound; (3) excision of the wound; (4) provision of drainage; (5) immobilization in a plaster-of-Paris cast.

Point 1: Prompt Surgical Treatment.—The successful healing of a wound depends largely on the promptitude with which appropriate treatment is given. The risk of serious post-traumatic infection is directly proportional to the time interval between the receipt of the wound and the surgical operation. The work of the rescue parties, ambulance services, first-aid posts, and resuscitation teams must all be organized in such a way as to enable surgical treatment to be given with the minimum of delay. The shorter the period during which the casualty is left untended, and the shorter the time taken in transport to hospital, the earlier can resuscitation begin and the patient be ready for operation.

At this stage let me say that the choice of anaesthetic is important if the operation is not to cause undue risk. Spinal anaesthesia should never be used in shocked patients. Gas-and-oxygen should be given only by an experienced anaesthetist, and if the latter is not available ether should be used. It is important to remember that a patient suffering from shock requires much less anaesthesia than a fit subject. The amount of anaesthetic given should be the minimum required to enable the surgeon to carry out his task. In cases of severe shock a local anaesthetic should be employed.

Point 2: Cleansing of the Wound.—No antiseptic known to-day is equal to soap and water as a means of dealing with contamination in a wound. Even the best antiseptic is unable to remove "dirt" from the wound, and the majority in fact actually fix the dirt in the tissues. Others increase the risk of infection by further destruction of the cells. Both sodium coco-nut soap and sodium ricinoleate are more effective in getting rid of bacteria from a wound than are most of the non-caustic antiseptics. The staphylococcus is the only organism that has a certain degree of resistance against these soaps. For the skin a solution of iodine or a similar skin antiseptic should be used. At the end of the operation the wound may be dusted with sulphanilamide. I never used this in my country, where I treated over a thousand cases with this technique, and with only a very few exceptions had uniformly good results; but there now appears to be enough experimental evidence to justify the local application of one of the sulphonamide compounds as a prophylactic measure.

Point 3: Excision of the Wound.—This is the keystone of the whole technique and the factor which permits the final procedure—namely, the application of a closed plaster. *Without proper excision no recent wound should be enclosed in plaster.* This is a rule to which there can be no exception, and it is generally a lack of appreciation of the vital importance of proper excision that is responsible for the failures that may occur with this technique. To ensure proper excision the wound must first be enlarged (the *débridement* of the French). In wounds caused by high-explosives the extent of damage in deeper tissues, particularly the muscles, is often enormously greater than that in the skin and superficial layers, and consequently, unless the traumatic opening in the skin is considerably enlarged by incision, excision of the deeper tissues is very difficult and must generally be incomplete. After the initial incision of the skin and fascia, and the excision of the dead portions of these tissues, the operation proceeds layer by layer into the deeper tissues in successive stages of incision and excision, until the bottom of the wound is reached. The periosteum, however, must never be incised. Only a narrow strip of skin should be excised; excision of the fascia should be radical, and that of the muscles still more radical, but in the case of the bone we must be as conservative as possible and limit resection to fragments which have lost their periosteal connexions or their muscular attachments.

Point 4: Provision of Drainage.—Dry gauze of a very fine mesh (similar to that employed in bandages of good quality) should be used to provide drainage for a recent wound. The gauze is inserted without pressure into the intramuscular spaces, and a flat layer is laid over the surface of the wound. Where a deep and narrow cavity remains at the bottom of the wound counter-drainage must be provided by the insertion of a piece of corrugated rubber through an opening into its most dependent part. The next and final stage of the technique, the immobilization in plaster, is also designed to provide drainage. Good plaster-of-Paris is highly absorbent, and the direct contact between the dry gauze and the plaster covering the wound facilitates the rapid absorption of the relatively small amount of discharge (mainly lymph and blood) which comes from a clean wound.

Point 5: Immobilization in Plaster-of-Paris Cast.—With the provision of drainage the last stage in the surgical procedure is accomplished and the wound is now ready for protection. The only single method that will prevent initial absorption of toxic products from the wound, protect the granulation tissue and newly formed epithelium from damage, and provide an effective barrier to secondary infection is the use of the plaster-of-Paris cast. This should be applied direct to the skin, except over bony prominences. The plaster should be well moulded to the limb, particularly over the wound, in order to establish good contact with the drainage gauze and to maintain a gentle pressure on the surface of the wound, a factor which assists the progress of epithelization.

Importance of Proper Wound Excision

Here, then, we have a "five-point technique." In treating a recent wound the surgeon's aim should be to fulfil to the utmost each and all of these five points. It is important, however, to remember that the keystone of the whole technique, on which success ultimately depends, lies in Point 3. Without proper excision, however faithfully the other points are fulfilled, the technique is worthless or even dangerous. Now, in that Point 3 is closely linked to, and indeed largely dependent on, Point 1, the latter is also an extremely important factor. Early operation is essential for proper excision. If the operation is carried out more than six or eight hours after infliction of the injury the contaminated area may by this time be so extensive that the amount of enlargement and excision required makes the procedure a very serious one. Point 5 in its turn depends on Point 3, for unless excision is complete the treatment of a recent wound in a closed plaster, far from being beneficial, is fraught with serious danger.

In the case of Points 2, 4, and 5 it might be possible, in certain injuries that are more frequent in peacetime than in wartime, to substitute alternative methods without seriously affecting the success of the treatment, as follows:

Point 2.—If and when an ideal antiseptic is found this may come to be used in place of the soap and water which are the best means known to-day of cleaning a wound.

Point 4.—In peacetime injuries drainage is not always necessary and the wound can often be closed by primary suture, although in war wounds primary suture is permissible only in exceptional cases.

Point 5.—Relatively good immobilization can be obtained by other methods—e.g., continuous traction, the Thomas or Braun splint, etc. Nevertheless the closed plaster, inasmuch as it provides many other beneficial effects that are absent in alternative methods, is in my opinion superior to all others for the treatment of recent wounds, always provided that Point 3 (excision) has been properly carried out, a factor which, as we have already seen, largely depends on the fulfilment of Point 1.

"Closed-plaster Technique"

In this article I have purposely avoided the term "closed-plaster technique"—which has generally been employed to describe the method I use for the treatment of recent wounds

—because it lays stress on only one part of the technique, and that, while undoubtedly of very great importance, not the most essential part. This misconception has given rise to some discussion as to the paternity of the technique which I have been advocating in this country during the past two years. Some surgeons believe that the only difference between my technique and that of Winnett Orr is that I use dry gauze and he vaselined gauze. I decided to take no part in a discussion which I thought would contribute nothing to the progress of our science and which would only seem to set me up as a rival to Winnett Orr, for whom I have a great admiration and respect. I now realize, however, that I made a big mistake in not doing so, for I find that many surgeons to-day are under the impression that my technique is simply the Orr technique applied to recent wounds—an impression which is so contrary to fact that it is apt to lead to disastrous results in treatment. The Orr technique, which Winnett Orr himself said was based on the provision of drainage and immobilization in plaster, is certainly the best method of treating wounds at a stage when the patient has survived the great dangers of the initial period. The indications for this later technique, if not universally accepted, are at least well known, and the sceptical attitude adopted by surgeons in Spain, France, and finally in England (I have reason to believe in the U.S.A. also), when I first reported the results I had obtained in treating recent wounds in Barcelona, was, I think, due to their belief that my method was nothing more than the Orr technique applied as soon as possible after the infliction of the wound. Moreover, experience seemed to justify the doubts of these surgeons, for complications occurred following the use of a technique based on drainage and plaster immobilization. Winnett Orr himself has recently stressed the fact that his technique is based on the two principles of drainage and rest, saying that excision is a secondary factor which should only be carried out by surgeons of wide experience. To this I would reply that my technique is based on five principles, the "points" that I have described, of which excision is the most essential of all, and that no surgeon who is incapable of performing an elaborate excision should attempt to employ it.

As I pointed out in the small book I published two years ago, my original idea when I first began using the technique in 1929 was to combine the principles of Friedrich and those of Winnett Orr. In presenting it to British surgeons after ten years of personal trial, in which the initial difficulties that accompany any new technique had been largely surmounted, I hoped that my technique would provide a starting-point from which surgeons in this country could develop further improvements, and that they should not have to solve for themselves the problems that confronted me twelve years ago.

In a base hospital, where surgeons have to deal only with patients who have survived the most critical period, the Orr technique is undoubtedly the best, and it was the cases which he saw in these conditions during the last war that suggested to Orr the technique which he later developed. But I am convinced that in dealing with recent wounds of any kind the only way to obviate the risk of gas gangrene or fulminating sepsis is to use a technique based on the five points which I have described. Further improvements should and will follow, but unless the treatment is built up on all five of the basic principles that I have so constantly described the technique is not my technique, and I disclaim all responsibility for the results which may follow its use.

Application of "Five-point Technique" to Front-line Casualties

It may be objected that in the case of wounds received in the front line application of the five-point technique is often impossible owing to the impracticability of fulfilling Point 1—namely, prompt surgical treatment. On the face of it such an objection would appear to have some justification. Although to-day a soldier wounded on the battlefield can be treated much more quickly than formerly, owing to the great mobility of modern warfare—for the speed of an advancing army, either his own or the enemy's, will quickly leave him in the rear—nevertheless a considerable period must still often elapse before he arrives in hospital. In this interval shock increases and his condition becomes more serious, and consequently, when eventually he reaches the surgeon, it may be found necessary to postpone operation until he is fit for it. Meanwhile the risk of gas gangrene developing is steadily increasing, and all too often by the time the patient has sufficiently recovered from shock to stand the operation this infection is already well established.

It is, however, still possible to apply the five-point technique to such cases if certain preliminary surgical measures are taken at the advanced casualty clearing station. The adoption of these measures will avoid, or at any rate lessen, the risk of gas gangrene and at the same time will allow the patient time for the resuscitation which he requires before the operation.

An injection of 0.005 g. of morphine in the case of patients whose sensitivity is already reduced by shock, or 0.2 to 0.5 g. of evipan in others, is a sufficient analgesic for the simple operative procedure required. The patient is laid on the table, undressed, and the wound examined, and as soon as the instruments are ready the injection is given. During the short operation a quick blood transfusion may be introduced by a rapid method such as the one of Duran (i.e., from closed bottles with an air pressure of 25 lb.). The skin surrounding the wound is quickly washed with soap and water and swabbed over with a solution of iodine. With a knife and a pair of scissors the wound is enlarged by incisions made above and below it, parallel to the long axis of the limb; the superficial and, when necessary, the deep fascia should be divided without hesitation. The wound is then dusted with sulphanilamide, a piece of dry gauze is inserted to keep it open, and the limb is immobilized by means of either a Thomas splint or a plaster cast. If the latter is used, a note must be written on the surface indicating that radical operation has not yet been performed.

The whole procedure will take a skilful surgeon less than ten minutes, and can be carried out while the first resuscitation treatment is taking place. The patient is then ready for evacuation to a base hospital, and can with relative safety wait for ten hours or so for his proper operation.

This preliminary treatment is equally applicable to air-raid casualties who have a serious penetrating wound and are severely shocked.

A FIRST-AID POST IN ACTION

BY

ARTHUR SHEARD, M.D.

The first-aid post with which I am associated is one of twenty-one similar first-aid posts in a northern city. It is in a large converted council school, and serves a well-populated working-class area of about 35,000 people. Organization and training of the staff are undertaken by my colleague, Dr. Arthur Barratt, and myself on alternate weeks. Every day the post is visited by the medical officer on duty, who also attends on three evenings each week to give instruction and supervise practice exercises, which are held very frequently.

The original staff of over 50 full-time workers has been cut down to 15, of whom 3 are men on 12-hour shifts of duty and 12 are women on 8-hour shifts. We depend very largely upon our part-time volunteer staff, numbering over 60, who take turns in sleeping at the post. A red warning brings a large number of volunteers for duty within a few minutes. Should the warning occur at night, between 7 p.m. and 7 a.m., four ambulances are sent to the post with ten cars for first-aid parties and sitting casualties. The officer in charge of the post is a full-time member of the staff, a nurse, who is responsible for the general administration in the absence of the medical officers. Her duties include supervision and training of the staff in first aid, home nursing, and gas decontamination. During a raid the medical officer is too busy doing surgical work to exercise command over the post, so the officer-in-charge supervises the organization, including various departments of control room with telephonists, clerks, and messengers, male and female reception rooms, first-aid rooms, rest rooms, store rooms, and canteen.

During the months of training we instituted a scheme for action stations, and by constant practice had reduced the time of preparation to less than five minutes. We found ourselves well prepared to render adequate treatment to the casualties

with reasonable speed and efficiency; the secret of success in this lies in the careful organization of the staff beforehand, all of whom should know their job and be keen to take their part in the team to which they may be attached. In my instruction classes I had often emphasized that the work of our youngest messenger-boy was equally important with that of the section leader or even the doctor; we should all work as a team in which every unit formed an important link.

Some Statistics

One air raid lasted about six hours, from 9 p.m. until 3 a.m. Most of the casualties occurred during the latter half of this period, when incendiary bombs were succeeded by high-explosives. Reception of casualties began soon after midnight and continued through the night until several hours after the "All clear." Thirty-three casualties passed through our hands, approximately one-tenth of all the casualties in the city. Of these, one was dead on arrival and seven others were sufficiently serious to require subsequent removal to hospital. One of these died at the post a few hours later. The remaining 25 had comparatively slight injuries, though all suffered from shock in varying degree; half of them came in on stretchers and recovered sufficiently to walk out.

The commonest injuries were lacerated wounds, abrasions, contusions, and burns. Haemorrhage from open wounds was often concealed, being soaked up by dirt and soot. We saw fractures of the pelvis, femur, tibia and fibula, rib and scapula, also a dislocation of the acromio-clavicular joint. One casualty had a crushed thorax. The nature of these casualties shows that we had been justified in including a number of serious cases in our training exercises. First-aid posts are intended primarily for minor casualties, but circumstances may direct serious ones there, and the post should be prepared to handle them efficiently.

Staff discipline was remarkably good, orders being obeyed promptly and without question. The section leaders learnt that in order to keep up with the arriving casualties they had to restrain their very natural desire to do dressings themselves and concentrate upon the direction and supervision of the volunteers under their charge. The number of staff proved inadequate to provide specialized teams exclusively for one job—e.g., the application of a Thomas splint. Our wards had been equipped with a dozen pairs of wooden trestles to serve as stretcher rests, and these were invaluable.

Our movable trolleys were a great advantage. As the medical officer moved from one case to another two trolleys followed him, one equipped with instruments and lotions, the other with a variety of dressings and bandages. Enough instruments were available to allow one set to be sterilized while the next case was receiving attention.

Cleansing and Resuscitation

One thing we had not foreseen—namely, the indescribably filthy condition of our patients, and the cleansing of them proved a much bigger job than we had anticipated. Free use was made of razor and hair clippers. After the injuries had received medical attention it was often necessary for our volunteers to give the patient a blanket bath. Difficulty was also experienced by dirt in the mouth and eyes. In some cases cleansing revealed other injuries which had hitherto been concealed by grime and soot. All our casualties suffered from shock, so that resuscitation became an important matter. The temperature was maintained at a constantly warm level. Blankets and hot-water bottles were provided for all stretcher cases; additional heat in serious cases was supplied by storm lamps placed under the stretcher beds, from which extra blankets hung down over the sides and ends to within six inches of the floor. A chamber of warm air was thus created underneath the stretcher bed. All patients able to swallow, except those with penetrating wounds of the abdomen, were given plenty of hot, sweetened tea. Several who were unable to sit up and use a feeding cup were given rubber tubes through which to suck their liquid from cups held just below the level of their faces. A natural consequence of the plentiful provision of fluid was a great demand for urine bottles; our supply of these was inadequate and improvisations had to be made.

In spite of all our care and attention one casualty with a crushed thorax died on our hands; another brought in during the raid was dead on arrival. During the following three days six other casualties were brought to the post, having been dug out by rescue parties and requiring certification by a doctor. This certification should be as complete as possible. A label should be tied on to the body, and should give the name of the first-aid post, the date, the name of the casualty, his address, where found, the time and cause of death, the name of the certifying doctor, also the destination of the conveyance. The ambulance driver will probably be able to furnish some of these particulars. One of our dead arrived at the mortuary with no identification label, which gave rise to much anxiety and trouble for several days.

Improvements Suggested by Experience

The following are improvements which our experience has suggested.

1. For the examination and treatment of any casualty the lighting cannot be too good. Accordingly both the male and female treatment rooms have been electrically wired to provide lighting plugs in the wall between each stretcher bed. Portable inspection lamps can now be plugged in at any desired point. Practice exercises have since shown the value of this improvement.

2. The cleansing of dirty skin and matted hair proved such an extensive business that ordinary soap and cotton-wool in kidney bowls were quite inadequate. The lather from soap failed to penetrate the pores of skin blasted by dirt and soot, while the cotton-wool became so matted with the hair as to be quite useless. We have now arranged for this washing to be done on a big scale with hot water in enamel buckets and plenty of liquid spirit soap applied with pieces of old towelling cut into large squares, which can be washed out and used again.

3. Our small receiving bowls and kidney dishes for soiled dressings were inadequate, so now we are collecting old newspapers. The soiled dressings are thrown on to several thicknesses of newspaper placed on the floor near each patient, and are subsequently rolled up and deposited into one large receptacle, which can later be taken out for disposal.

4. Our floors became very dirty, and we found that they could best be cleaned after a liberal sprinkling of wet sawdust, wet tea-leaves, or the preparation called "hygenol."

5. Unless morphine and A.T.S. were given immediately they were ordered the medical officer could not always be sure that his instructions had been carried out correctly. Accordingly we now have a hypodermic unit, consisting of a tray on which are set out sterilized syringes and needles, supplies of morphine and antitetanus serum, antiseptic lotion for skin sterilization, cotton-wool, receptacles for used needles and swabs, also a coloured skin pencil. This tray is provided with straps and is carried round by an attendant specially detailed for this duty. The actual injections are given by a fully trained nurse. All casualties to whom morphine has been given are marked on the forehead by a red pencil with the letter "M"; the dose and time of administration should also be noted.

Correspondence

Mass Radiography and the Recruit

SIR,—In your issue of May 2 (p. 562) Dr. Geoffrey Marshall says that "Authority declined" (the use of this method) "for reasons similar to those advanced by Sir Frederick Menzies."

The recommendations made by the Medical Advisory Committee under the National Service Acts in June, 1940, and now repeated after re-survey of all the facts, had nothing whatever to do with the two questions recently raised by Sir Frederick. May I remind Dr. Marshall, himself a member of the committee, that the reasons influencing us were entirely concerned with the administrative difficulties involved, at the same time having regard to the magnitude of the problem, which is known to be not greater than between one and two per thousand.—I am, etc.,

London, W.1. HORDER.

Mass Miniature Radiography

SIR,—Your annotation on this subject (May 9, p. 586) states that in your view Lord Horder's committee was wrong in its recommendations in 1940, and implies that the committee is still wrong. You state that "when the committee met in May, 1940, there was plenty of evidence available on the value of mass radiography," as shown by a leading article and a paper by

ourselves in your columns of June 1 of that year. Is there not some confusion here? Lord Horder's committee does not deny the value of radiography in the detection of incipient pulmonary tuberculosis. They accept the view that the method of mass miniature radiography is the most suitable means of applying radiological examination where there are large numbers to be examined. They reiterate the opinion previously expressed that it would be ideal to add such an examination to the clinical examination already undertaken by medical boards. But they consider that this is not practicable and feel that the most satisfactory alternative is to undertake radiological examination as widely as possible after the entry of recruits into the Service.

Our own view, expressed two years ago, to which you refer, is in complete agreement with the Horder committee. Whilst then stressing the great importance of the new method and its wide future use, we stated:

"The administrative problems concerned in the possible application of screen photography now to the armed Forces can only be considered properly by the appropriate authorities. The great difficulties of organization in time of war with everything pressing for attention at the same moment can only be appreciated fully by those with a large administrative experience. It is suggested for consideration that if advance is to be made on these lines the difficulties may be less if the examination is carried out as soon as possible *after* enlistment than if it is attempted before or in conjunction with examination by the medical boards. As the search is for early disease there will be found a great many shadows which need careful watching before a definite decision can be reached as to their significance. It is doubtful if, in addition to difficulties of sheer arrangement, sufficient control could in many instances be kept over the suspect to enable satisfactory assessment to be carried out before enlistment."

We referred also to the greater ease with which the method could be used in the Navy, and visualized that by the time peace comes much practical experience would have been gained of miniature radiography in this country. We then gave some indication of how we thought the method would be employed among the civilian community.

At the present time it is true that we have neither equipment nor suitable personnel available in sufficient numbers to put the method into any other than sporadic or experimental use where suitable conditions appertain. After the war we look forward to seeing large sections of the general population passing through the screen camera. We would hope then that such investigation should become part of the school-leaving examination and that re-examination should be offered annually till, say, 30 years of age.—We are, etc.,

F. J. BENTLEY.
Z. A. LEITNER.

London, S.E.1.

Diphtheria Prophylaxis

SIR,—The suggestions which are made in your leading article of May 2 concerning diphtheria immunization can only meet with general approval. But is it not unfortunate that this immunization should have been taken out of the hands of the general practitioner and be available only from the county medical officer of health? Many parents are unwilling to take their children to the local elementary schools in order to obtain the necessary injections, and as the prophylactic is no longer available to the G.P. many opportunities of securing immunization are being lost. I have had recently to tell the parents of four children that immunization cannot be carried out by their own doctor, with the result that all four remain unprotected.

We all know the Ministry of Health's hostility towards the general practitioner, but surely in this instance some temporary compromise could be arranged.—I am, etc.,

HAROLD J. SELBY.

Newnham, Glos.

SIR,—In your leading article (May 2, p. 556) I read of suggestions for stimulating competition, including possible rewards to the most successful area, in a campaign to see that as many children as possible are immunized before the autumn of this year. There may, however, be a few towns in which persuasion by officials has not been "suspect" but supported, and of these the community which I have the pleasure to serve is one. I agree with you that nothing has the same force as personal persuasion and advocacy. Locally this has been in progress for twelve years, with the satisfactory, though not satisfied, result that 90% of the *present* school population and 40% of the children under school age are already protected. Consequently this town could not hope to shine in any "flash" competition. It would start with an overwhelming handicap.

I am not aware that an authenticated list of towns, country districts, etc., showing the position as regards protection is available for publicity purposes. Might it not be possible for such a list to be published, to show the percentages protected, say, at mid-year 1942, and an official "pat-on-the-back" to be given to communities which have done well, or a word of encouragement, by comparison, to those which still lag behind?—I am, etc.,

R. J. MAULE HORNE,
Medical Officer of Health.

Poole.

Thyroid Gland and Cardiovascular System

SIR,—In your recent leader[1] you stress the importance of the raised cardiac output of Graves's disease and its dependence upon an increased venous return, but you suggest that both may be due to an excess of "certain metabolites" in the tissues; you quote as comparable the mechanism which underlies the increased venous return and cardiac output of exercise. There is, however, ample evidence that the mechanism involved in the increased cardiac output of the two conditions is fundamentally different. In the main the circulatory adjustments to exercise are regulated by the enormously increased consumption of oxygen and liberation of carbon dioxide by the peripheral tissues, but in thyrotoxicosis the increased cardiac output is pathological and mainly "centrally" produced by the action of the thyroid hormone on the myocardium. Though generally overlooked, this is an important point in the pathology of Graves's disease, and some of the relevant evidence may be mentioned.

Though the cardiac output in thyrotoxicosis is well correlated to the metabolic rate Boothby and Rynearson[2] showed that the resulting regression line lies definitely above that for work in healthy persons; or, in other words, for the same level of tissue activity and oxygen consumption the cardiac output is distinctly greater in thyrotoxicosis than in exercise. This agrees with data for the arteriovenous oxygen difference in thyrotoxicosis. Gladstone,[3] for example, found that for an average basal metabolic rate of +33% the cardiac output was doubled and the arteriovenous oxygen difference decreased by 37%; similarly Boeger and Wezler[4] found that the arteriovenous oxygen difference was reduced by as much as 50%. The converse has been demonstrated in myxoedema (Stewart, Deitrick, and Crane[5]), where abnormal slowing of the circulation results in an increased arteriovenous oxygen difference despite the subnormal level of tissue metabolism. It is surely significant that the respiration rate[6] and pulmonary ventilation are not proportionately increased in thyrotoxicosis even when the basal metabolic rate is very high, suggesting that there is no accumulation of metabolic products in the cells, at least of the respiratory centre.

It seems reasonable, therefore, to conclude that the increase in volume flow of blood through the tissues in thyrotoxicosis is out of all proportion to their oxygen requirements and metabolic activities. The explanation of the widespread peripheral vasodilatation which makes possible this greatly increased flow should also be sought elsewhere; the special importance of heat regulation in this condition should not be overlooked. Other factors concerned in the increased circulation rate of thyrotoxicosis are an increase in the blood volume (Gibson and Harris[7]) and a reduction in the plasma proteins and plasma osmotic pressure (Bartels[8]).

A clear appreciation by the clinician of the fact that excessive thyroid secretion directly causes abnormal "stimulation" of the heart's activity is important. It is the physical basis for the most constant symptom—palpitation. The increased cardiac output, being out of proportion to the body's needs, constitutes a waseful expenditure of effort. Exhaustion of the myocardium

1 *British Medical Journal*, 1942, **1**, 527.
2 *Arch. intern. Med.*, 1935, **55**, 547.
3 *Proc. Soc. exp. Biol.*, N.Y., 1936, **34**, 587.
4 *Z. ges. exp. Med.*, 1937, **102**, 134.
5 *J. clin. Invest.*, 1938, **17**, 237.
6 MacLagan, personal communication.
7 *J. clin. Invest.*, 1939, **18**, 59.
8 *New Engl. J. Med.*, 1938, **218**, 289.

is an ever-present risk if not an inevitable sequel in later life. Fortunately thyroidectomy reverses the series of changes and restores cardiac output and work to normal.—I am, etc.,

South Middlesex Emergency Hospital. FRANCIS F. RUNDLE.

Council of Royal College of Surgeons

SIR,—I welcome the letter from E. A. Crook and others in your issue of April 18. I have long held that certain changes in representation on the Council would benefit the College. I think it is very desirable that there should be a more frequent change-over of personnel. To this end there should be a definite limit to the length of service, to enable Fellows to serve at a younger age than in the past. This could be arranged in several ways. One way would be to reduce the initial period to five years and limit the term of service to three periods. In any case, I think, a limit should be set to length of service and to age, whichever comes first.

At most teaching hospitals the retiring age is now 60. This might reasonably apply to members of the Council, unless holding the office of President or Vice-President. Possibly some year between 60 and 65 might be considered more suitable. It is not easy for a Vice-President to carry out his duties, which involve attending all committees, sometimes two, three, or even more a week, while still on the active list of his hospital, and it is even more difficult for the President, who in these days has almost a whole-time job. For this reason, apart from prestige and experience, these officers should always be senior men. I think that if a retiring age is fixed members of Council who have recently retired for age or length of service should be eligible for election to the Presidency (and perhaps also as Vice-Presidents).

It is desirable that representation should cover as wide a field as possible, and it would therefore be wise to limit the number of representatives from any one school.

To get alterations made in the Charter is no easy matter, but in view of the prevailing idea that big changes are coming in the profession it might be opportune for the Council to appoint a committee to consider what, if any, changes are desirable—that is, if they have not already done so.—I am, etc.,

Northern Command. C. GORDON-WATSON.

SIR,—I thoroughly endorse the views put forward by the ten signatories to the excellent letter (April 18, p. 505) regarding the election to the Council of the Royal College of Surgeons, but I should like to see the matter taken considerably further than the suggestions laid out in that letter.

For instance, everyone will agree that every Councillor would hope to attain the high honour of holding the Presidential chair, and we all equally know that every Councillor cannot reach that height, but every man would have a considerably better chance if, say, a rule was brought in restricting a President from holding the chair for more than two consecutive years—for example, one re-election only and then he should be satisfied and finished and not be allowed to sit again for re-election on the Council. There have been instances of the Presidential chair being held for four, five, and, I think, even six years, thus blocking the men below, many of whom will never have a chance.

Again, no Fellow should be allowed to sit on the Council for more than 12 years—for example, elected for six years and then possibly re-elected for another six years and then finished if after that time he is unfortunate enough not to be elected to the chair.

As to the question of personal canvassing, I should like to see this considerably tightened up. I myself have been personally canvassed by a candidate whom I met but once in my life, and then for a few seconds only, but on reporting this to the Council no action was taken. I should like to see a rule brought in that would bar such a man from even having his name up for at least five years. I have also been told of a candidate who spent his holiday in personally canvassing, and he got in over the head of a man who had already been on the Council and was thus unseated, though he got elected the next year.

It is all these things which make many Fellows dissatisfied with the present rules for election to the Council, and the time is long over-ripe for their vigorous amendment.—I am, etc.,

Welshpool. H. G. PINKER, F.R.C.S.

Industrial Medicine and Sickness Absence

SIR,—Dr. Stuart McAusland (May 2, p. 566) complains (from the insurance companies' point of view) that the panel doctor often certifies a person as incapacitated for work who has been discharged from the out-patient department of a hospital as fit to return to work. But looked at from the viewpoint of a medical referee the hospital certificate of "fitness to return to work" is often misleading. The worker may be indeed fit for a gradual return to work, but the panel doctor finds, as I find, that the employer and the insurance company make no arrangements for "reconditioning" an injured or recently sick person before setting him to a full day's work. The worker is only fit for a gradual return to work, and since this is not permitted the panel doctor rightly certifies him as unfit for work.

Instead of complaining about the panel doctor Dr. McAusland might employ his energies in educating employers and insurance companies to realize the need for "rehabilitating" (or, as I prefer to put it, "reconditioning") the recently disabled and newly recovering worker.—I am, etc.,

J. A. NIXON,

Bristol. Medical Referee under the W.C.A.

SIR,—No one would quarrel with Mr. Watson-Jones (April 11, p. 478) on the urgency of encouraging the earliest possible return to duty of sick and injured workers. With his second suggestion—that we should not now waste our time on future planning—I, for one, cannot agree.

The very form of his letter would give the uninformed the impression that doctors were neglecting the immediate urgent work because they were spending so much valuable time in planning for the future. This, of course, is quite wrong; for if London may be taken as a criterion only a very few doctors, anxious about their duty to their more hard-pressed colleagues, both in civil and military practice, are giving up an hour or two out of their spare time each week to put forward views that may bring about a better understanding and co-operation, first in the profession itself and then in its relation to the health of the public. If the need for this were not already apparent, surely the letter of Dr. Stuart McAusland (May 2, p. 566), in his vehement support of Mr. Watson-Jones, inadvertently brings out two points which are just such a justification.

1. He is "appalled" at the very many patients who are discharged from the hospital as fit but who are still receiving incapacity certificates from their panel doctors. There are many reasons why such a state of affairs exists, but they are all due basically to the lack of co-ordination between the G.P. and the hospitals. This is one of the evils which we wish to eradicate, and it might even now be attempted! At this stage it is interesting to note that Dr. McAusland spends most of his time examining accident cases for employers, insurance companies, and solicitors. I wonder whether his conclusions would be substantiated by a doctor examining these same people on behalf of the workers themselves—a doctor who was conversant with their standard of life, incomes, anxieties, conditions of work, and travelling time. A reference to the very large number of compensation cases where conflicting medical opinion is given in the courts would indicate that Dr. McAusland's conclusions may not always be accepted.

2. The G.P.s have very little time to do anything but issue the certificates. What a reflection on a system which, according to a generalization in a recent B.M.A. publication, has stood the test of thirty years! Actually the underlying reason for this unsatisfactory state is bound up with the economic structure of the medical profession, which Dr. McAusland does not think needs much attention, and, peculiarly enough, he is quite sure that hospital organization requires drastic overhauling. Surely this is because he is aware of the hospital shortcomings, but, I venture to suggest, understands very little of the position of G.P.s, who up till quite recently have remained almost inarticulate.

Lest there be any misunderstanding as to my own position I should like to point out that some years ago I gave up a large panel and private practice. One of the reasons for so doing was that I felt unable to give my patients the attention which I believed they needed, owing to the necessity for seeing so many people in order to maintain a reasonable standard of life for my family. By taking a better private practice with a smaller panel I now feel that I can give the time to my panel, and

have, in fact, subsidized it by private work. What, then, of the G.P. who has to attend to 2,500 panel patients for about £1,075 per annum? Has he the time to coax and urge patients back to work before they feel able?

Finally, is it fair to assume that the majority of workers are not anxious to get back to work as soon as possible? Have these writers a monopoly of patriotism?—I am, etc.,

Highgate, N.6. WILLIAM W. FOX.

Medical Certification in Industry

SIR,—The highly interesting article by Dr. A. Kefalas (April 25, p. 531) reveals not only the doctor's dilemma in regard to questions of certification of industrial sickness but also the difficulties, under the present system of medical administration of social insurance, of dealing adequately with the matter. If, as under systems existing abroad, there were a Workmen's Compensation Board (with regional branches) or collective mutual indemnity associations for groups of industry entrusted not only with cash payments but also with prevention and treatment of injury, the difficulty would hardly exist. For such administration would employ its own forwarding doctors (see for this the respective evidence before the Royal Commission on Workmen's Compensation) and specialists, trained in the various types of industrial disease as they occur in different industries; as such medical officers would be the employees not of the establishment but of the Board or the collective association, they would not only command the fullest respect of the worker but also be above any suspicion of bias. From a social point of view it should be far more desirable that workers should be anxious about occupational risks and not careless about them than the other way.

As a social reformer I feel somewhat surprised to hear a complaint of "bad, lazy, dishonest, and hypochondriacal workpeople." I would have thought that according to many high British medical authorities in matters of industrial medicine, such as Dr. Brend, Dr. Norris, and others, the assumption of "malingering" as anything like a general feature ought to be ruled out, while there is enough evidence to show that reluctance on the part of workers to be examined and treated at an early date is prevalent. Under such circumstances it seems hardly advisable that, if the arbitrating doctor decided against the patient, the latter should have to bear the cost of the examination. To employ only such workers as are physically fit for their work should be a duty incumbent on employers, and medical examinations, initial or periodical, will only benefit them in the long run by diminishing claims for compensation. The silicosis and asbestosis schemes and other special compensation schemes made by the Home Office, with their medical arrangements for examination and certification of cases, appear a hopeful beginning, though hitherto on a far too limited scale.—I am, etc.,

Richmond, Surrey. HERMANN LEVY.

Rehabilitation

SIR,—The enthusiastic words of Mr. R. Watson-Jones about rehabilitation in the Royal Air Force (March 28, p. 403) make good reading to those devoted Continental friends of this country who, like myself, for more than 20 years have emphasized the urgent need for creating such centres for the treatment of industrial accidents. I have often expressed surprise at the lack of proper understanding of this special branch of medicine in a country with such a high industrial development like Great Britain has been since the latter half of the last century. I did so especially on the occasion when, following an article of mine upon "Treatment of Insured Persons in Czechoslovakia" (*Arch. med. Hydr.*, 1931), I had the pleasure of discussing the matter with some members of the British T.U.C. who visited our rehabilitation centre in Czechoslovakia. Very little has been done in spite of all that; and things have not been much better with the armed Forces either, at least not in the first years of this war.

More than 25 years ago a special rehabilitation centre with accommodation for 500 officers and men was built at Pistany Spa in Czechoslovakia—the "Pro Patria." The valuable work done in this institution is described in an article of mine: "Die Versorgung der Kriegskranken in der Cechoslovakei" (*Zeitschr. f. wissensch. Bäderkunde*, 1928, H. 11). After the last war this centre was switched over for the treatment of industrial accidents. I acted there both during the military and civilian period for a considerable length of time, watching with enthusiasm, as Mr. Watson-Jones does now, the excellent and highly profitable results which can be achieved at the proper place with the proper methods by the proper man. On the basis of this experience may I offer (*a*) some criticism and (*b*) some practical remarks.

(*a*) It is by no means justifiable to underestimate the role of physiotherapy in rehabilitation. On the contrary, this is of fundamental importance, as the biological reparative action of the physiotherapeutic measures forms the foundation on which the psychological edifice of the rehabilitation can be successfully built up. And this for two main reasons. First, nothing is so suitable to alleviate the pain which is a great handicap not only when first trying to use the injured muscles and joints, but also later on when trying to enlarge the radius of the movements. Secondly, physiotherapy offers the best means for promoting the resorption of the always present blood-extravasates, exudates, and other inflammatory (occasionally infective) products. It is with the help of these measures that we are able to produce at any particular spot in the body an intensive hyperaemia with all its beneficial effects, direct and indirect. While stressing this point I want by no means to minimize the vital importance of the other postulates of a successful rehabilitation treatment as suggested and practised by Mr. Watson-Jones. I can certainly support his view, also, that "the individual treatment by medical officers of the right type" is and remains the "Stone of Wisdom" in this case.

(*b*) The desiderata for the lay-out and complete equipment of a rehabilitation centre are manifold and not so easily satisfied. And yet at the outbreak of this war there were more than a dozen of such ideally suited places practically ready, with small adaptations, for use in the various British health resorts. Nevertheless they were taken over to accommodate part of the administrative war machine. After all, in a war it is the fighting man (or woman) who should have first consideration; the more so because once definitely incapacitated they become a social burden till the end of their lives. I think it is high time that the competent authorities should free the British health resorts from their "bureaucratic guests" and facilitate in every other way the creation of rehabilitation centres in the most suitable environment for the restoration to health and happiness of many thousands of the best sons and daughters of this country.—I am, etc.,

Grantham. L. SCHMIDT, M.D.Prague.

Cancer Research

SIR,—Your leading article on cancer research (May 2, p. 555) states in the last paragraph: "Studies . . . have shown that conditions which obtain in healing wounds favour the appearance of progressively growing malignant tumours at such a site. This finding . . . also gives further support to the general belief that trauma—a fracture, for instance—may sometimes be the determining cause of a malignant tumour in man." I feel it is essential, in the interests of further research and of such practical considerations as decisions in insurance cases, to point out that clinical facts so far seem to force us to modify the first and deny the second of these statements. Malignant tumours develop on rare occasions on hypertrophic scars, especially near tuberculous and other chronic sinuses. Malignancy here is due more probably to long-standing toxic and chemical irritation by pus or therapeutic agents than to abnormal repair.

I do not know of a single case of proved malignant degeneration in the callus during the repair of a fracture. The number of fractures has very much increased, so have our opportunities to study repair owing to progress in the operative treatment of fractures, and radiological diagnosis of bone tumours is possible much earlier than, say, 20 years ago. There has been no even remotely comparable increase in the number of malignant bone tumours. Hypertrophic callus is not too uncommon, but never develops into malignancy. If, among the millions of fractures treated all over the world, there were a few isolated instances in which the fracture was not the consequence but a possible cause of malignant tumours, it would still be safer to assume the coincidence of two common conditions than a traumatic genesis of cancer. In bone malignant growth is clearly linked to normal growth, the vast majority of bone sarcomata occurring near an epiphysis in people under 25. It is doubtless connected

with some ill-defined types of degenerative bone change; sarcoma supervenes in 10% of patients suffering from Paget's disease. Secondary tumours follow closely the distribution of blood and lymph circulations and are often the cause, never the sequel, of fractures.

As to the need for a strict definition of the term "trauma," may I refer to my letter on injury and internal disease which you were good enough to print on May 10, 1941.—I am, etc.,

London, W.1. L. MICHAELIS.

Mortality in Lobar Pneumonia

SIR,—I wish to add my testimony to that of Sir Adolphe Abrahams (May 2, p. 562). While I was resident physician in a large hospital I had, during a period of six months, full control of the treatment of nearly 50 consecutive cases of lobar pneumonia. There were no deaths. They were all treated on old-fashioned principles and everyone was given brandy. Later, in practice, I treated many cases in the same way with only two deaths. These two patients were alcoholic and succumbed on the third and fifth days of the disease respectively. I see nothing wonderful in all this, but I can quite understand why serum-treated patients so often succumb. To those who scoff at brandy as a cardiac stimulant my advice is to try it in cases of lobar pneumonia. In this disease the great danger, of course, is heart failure. Brandy goes a long way towards preventing this.—I am, etc.,

Edinburgh. JAMES BURNET.

Epididymitis after Acute Gonorrhoea

SIR,—Will you allow me space to thank those correspondents who so kindly offered explanations of the case I recorded in your issue of April 18 and to comment on some of the points raised? I am inclined to agree with Dr. McLachlan and Dr. Ingram (May 2, p. 564), and have for some time held the view that gonococci situated in closed foci may escape destruction by chemotherapy and the patient become a carrier.

To my very good friend Dr. Harkness (p. 564) I would say that opinions are divided as regards the value of irrigations in addition to chemotherapy, that circumstances demand that preliminary tests of cure be carried out before a soldier leaves hospital, and that in my opinion every venereologist worthy of the name realizes that overstrong antiseptics and unskilful irrigation are liable to traumatize the urethra. Further, I would like to ask him how many soldiers (out of many thousands) he has treated for non-gonococcal infection and how he knows that these latter *resulted* from treatment for gonorrhoea in military hospitals. From an intimate knowledge of the methods employed in military hospitals I would say that the standards of treatment—speaking generally—are very high.—I am, etc.,

London, S.W.1. T. E. OSMOND.

SIR,—In regard to the probable explanation of Lieut.-Col. T. E. Osmond's case (April 18, p. 507) I am in agreement with the views expressed by Dr. A. H. Harkness (May 2, p. 564). The practice of conducting "tests for cure" too soon after the completion of chemotherapy is much too prevalent and is, in my experience, not to be commended. Urethral trauma is a very real danger, and I have had to deal with numerous cases of non-gonococcal infection as a result of this well-meant but somewhat over-zealous procedure. I think there is little doubt that the case in question can be attributed to premature instrumentation in the presence of a residual genito-urinary infection.—I am, etc.,

Durham. W. GILLIES ANNAN.

Sulphadiazine for Gonorrhoea

SIR,—There is no doubt that the toxicity of the sulphanilamide preparations has been a great hindrance to their use in the treatment of ambulatory conditions such as gonorrhoea. A large percentage of cases, especially female cases, had to have their treatment interrupted or curtailed owing to the occurrence of gastric disturbance, skin eruptions, and other well-known toxic symptoms which occurred in spite of strict supervision.

Recently a clinical trial has been carried out at the Whitechapel (L.C.C.) Clinic on 34 cases of acute gonorrhoea (24 men and 10 women) with the preparation sulphadiazine (2-sulphanilamidopyrimidine), using a dosage of 37 g. in 14 days and 3 weeks respectively. In no case has any toxic manifestation been complained about or observed which required any deviation from the line of treatment adopted. Tests were taken daily, and in all cases the discharge cleared up rapidly and the gonococcus had disappeared from the secretions in the first twenty-four hours. No case of drug-fastness or relapse has been observed up to date. Two cases were reinfected whilst undergoing observation. Four of these cases had previously been treated with sulphapyridine, but had been found to be drug-fast and so failed to respond to that preparation. Two of the female cases were pregnant.

I quite realize that the number of cases is small, and hope to be able to furnish a more detailed account in the near future, but I thought that it would be interesting to find out as soon as possible the experiences of other venereologists who have used this preparation.—I am, etc.,

London, E.1. W. NEVILLE MASCALL.

Enuresis in Children

SIR,—All cases of enuresis cannot be explained on the same basis. Some are undoubtedly due to local causes in the genito-urinary system, but those are in the minority. Phimosis, urethritis, worms, urinary troubles can all set up a stimulus to void urine in sleep. If these are left too long their correction may not abolish the enuresis, as the condition may become a habit. Brushing aside the physical causes, I think enuresis in children can be explained on one or other of the following lines.

1. In the normal child somatic expression of fear or anxiety. Witness the boy in the junior schoolroom: through fear of punishment he may be, even in full consciousness, unable to maintain control of his vegetative nervous system and wets the floor beneath him. In sleep, with its attendant youthful dreams, the school child will readily re-live the day that is past or fashion one for the following day. Hence he is likely to wet the bed, have a disturbed sleep, or may even exhibit night starts. Apart from the schoolroom, I am afraid the mythical "horde father" is still to be found in many a home! Through wrong upbringing and the inculcation of fear into his children, such a father might easily produce fears in them. In the tender nervous system of a child these are not forgotten and may be outwardly expressed as enuresis.

2. All children up to a certain age are enuritics. In some cases it may remain longer than normal by reason of faulty education and rearing in the home. I wonder if the aboriginal races are normally enuritic.

3. Endocrinal. Probably a number of bed-wetters have the origin of the abnormality in the endocrine system. Biological processes are less stable in children than in adults, and the endocrinal system calls forth a delicate interplay. Any unusual stress may upset this through the suprarenal or pituitary body.

4. I agree with Dr. I. Gordon (March 14) that allergy in certain cases of enuresis is only a manifestation of a constitutional psychopathic trait. Bed-wetters are often highly strung, apprehensive, and live every hour of the day. It would seem as if they have an inborn, latent neurovegetative instability which can become dynamic by psychological stimuli ignored in the normal child. Even the most careful nurturing of these children will not always prevent expressions of this instability, shown by enuresis, stammering, tics, etc.

Successful treatment of enuresis working on the above aetiological lines would resolve itself into a thorough understanding of the child's personality, the abolition of fear, securing co-operation of the patient, the abolition of the "horde"-father outlook, and in general better educational guidance. If many enuritics were regarded as "problem children" and treated along proper psychological lines I believe we could effectively eradicate the condition in a large number of cases.—I am, etc.,

Curragh, Kildare. JOHN J. WALLS, M.D.

Benzyl Benzoate for the Head Louse

SIR,—Dr. J. R. Busvine and Prof. P. A. Buxton are certainly to be congratulated on their valuable article (April 11, p. 464). The whole crux of the problem, as they point out, is to prevent reinfestation after a head has once been cleansed. Every examining surgeon of factories in large industrial areas soon finds how depressingly frequently he is compelled to refuse certification to the same unfortunate individuals for this reason.

The excellent cleansing stations in the London area adopt none but mechanical means for removing nits, although they usually use an alkaline shampoo of washing soda and bicarbonate of soda in soft soap, which causes the nits to swell up and be more easily removed. An insecticide which will be effective over a long period is therefore the solution of the difficulty. In my experience benzyl benzoate has been used empirically for years for this purpose, as also to slay the body louse and scabies parasite. Benzyl benzoate has been used for many years in Mohammedan countries as a solvent and vehicle for perfumes instead of alcohol. In this way workers preparing the substance learnt from the East that it could be used against body parasites generally. It is a pleasant substance to use, with a faintly balsamic odour, liquid at the temperature of a warm room. It does not appear to cause dermatitis, for it is handled freely when frozen and centrifuged to removed impurities, as well as in the liquid state. (I may say that for some years I have supervised workers preparing many hundreds of tons of the substance.) Workers in the trade are convinced that it is effective against the head louse. I wonder if any of your readers could confirm this?—I am, etc.,

London, N.16. E. H. STRANGE.

Army Recruits and Appendicitis

SIR,—I have been employed recently as a retired R.A.M.C. officer at a large infantry depot. While examining newly arrived recruits I noticed how prevalent the scar of the appendicitis operation was among the pre-O.C.T.U. candidates, who were almost entirely drawn from public schools and universities, as compared with their fellow working-class recruits chiefly drawn from London's East End. I therefore made a more detailed survey with the following results (nearest decimal figure in percentages):

(*a*) From recruits (call-up) all ages 19–41, 1,331 showed 42 appendix scars, or 3.2%. (*b*) From pre-O.C.T.U. volunteer recruits aged 18–20, 120 showed 27 appendix scars, or 24.5%. (*c*) From recruits (call-up) aged 19, included in (*a*), 458 showed 14 appendix scars, or 3.1%. (*d*) From recruits (call-up) aged 38–41, included in (*a*), 496 showed 20 appendix scars, or 4%. (*e*) From recruits (call-up) aged 38–41, included in (*d*), 164 showed 8 appendix scars, or 4.9%. These were chiefly labourers from the London area. (*f*) From recruits (call-up) aged 38–41, included in (*d*), 332 had 12 appendix scars, or 3.6%. These were chiefly labourers from Liverpool and Manchester area.

These figures show a remarkable liability to operation for appendicitis (24.5%) among the pre-O.C.T.U. candidates, who were practically all students, as compared with Group (*c*) ordinary recruits (3.1%). Is this due to diet, occupation, surgical enthusiasm, or some other cause? Group (*d*), aged 38-41, shows that the 20 years separating these recruits from Group (*c*) has increased the liability to operation by only 0.9%. Groups (*e*) and (*f*) appear to show a slightly greater tendency to appendicitis among Londoners than among the men of Liverpool and Manchester, but the latter were mostly navvies and therefore particularly robust for their age.—I am, etc.,

W. E. C. LUNN-ROCKLIFFE, Lieut.-Col., R.A.M.C. (ret.).

Destruction of Vitamin C in Transported Hot Meals

SIR,—The difficulty of supplying vitamin C in meals cooked at communal kitchens and conveyed to schools in steam-heated containers has been mentioned by several writers recently. Greens served in this way with an interval of about 1 to 2 hours between cooking and serving will be useless, and shredded raw vegetable in soup will be likewise, unless added at the last moment at the serving centre. Salads require far more labour in preparation and are expensive except for a few months in the summer.

Might I make the suggestion that the problem is overcome next winter by distributing to the communal feeding centres the blackcurrant juice and purée as given this year to toddlers. The majority of toddlers disliked the purée, and the mothers disliked the juice for infants, much therefore being wasted. The vitamin C distribution for the whole country could be on the following lines: oranges, orange juice, and rose-hip syrup for infants up to 5 years; blackcurrant juice and purée and rose-hip conserve for distribution to communal kitchens of cities and factories to be served with puddings instead of chocolate and custard sauce; and raw and fresh-cooked vegetables to be eaten by people in their own homes.—I am, etc.,

Chester. EDNA WILLIAMS.

Blindness after Haemorrhage

SIR,—With reference to Dr. H. L. Tidy's case of blindness following haemorrhage (May 24, 1941, p. 774) and my letter to the *Journal* of Nov. 15, 1940, I found an abstract made by me of a German inaugural dissertation on the subject many years ago. The facts are remarkable and are as follows.

In the cases of artificial blood-letting the damage was almost immediate. In other cases the onset was 3 to 6 days and even up to 18 days after the haemorrhage. In my own cases there was no recovery.

It is obvious that some centuries ago records might not be very accurate. The German work seemed to be very careful and thorough. In the 235 years from 1641 to 1875 there were, with 13 new cases, 106 in all. They include the haemorrhages already set out, plus artificial blood-letting and a small number of wounds: 11 cases involved one eye, 94 cases both eyes; in a small number unequally, resulting in one eye blind and the other less damaged. In 91 cases, 43 showed no improvement, 28 some improvement, 19 recovered.

It will be noted that the condition is very rare, that some of the cases recovered more or less, and that some followed venesection, which presumably must have been practised for some pathological condition. I may add that in the few cases I saw the most thorough investigation was made with expert pathological help but without obtaining any light on the factor which causes it.

I am sorry to say the inaugural dissertation has been mislaid; possibly it may be found in some British library. I obtained it from Germany when cases came to me.—I am, etc.,

Melbourne, Australia. JAMES W. BARRETT.

Problems of Pain

SIR,—The acuteness of observation and deduction shown by Mr. Francis Brown in his article (May 2, p. 543) prompts me to ask if he can shed light on a problem which has long puzzled many of us. I refer to pain sensation in the teeth. To quote from Mr. Brown's article: ". . . where a particular sensation is essential for the welfare and survival of the organism it will be provided; if it is unnecessary or undesirable it will not be provided."

The localization of touch sensation in the teeth is performed by the nerves to the periodontal membrane: pulpitis unassociated with periodontitis is very inaccurately located as a rule. The nerves to the pulp and dentine seem to be concerned with the sensation of pain only; whether the stimulus is heat, cold, or pressure the response is always the same—pain.

The intact pulp itself is exquisitely sensitive, as everyone knows, and sound exposed dentine is at first only slightly less so. In time, however, this exposed surface, whether produced by fracture or the recession of gum from the cervical margin, becomes insensitive owing to the sealing-off of the tubules extending from the exposed area to the pulp, as shown by E. W. Fish. In decay the same thing happens; the bundles of dentinal tubules become sealed off after being reached by the advancing decay—unless the latter is more rapid than the sealing-off process, as sometimes happens—and are no longer sensitive. The pain, if any, in a small cavity not encroaching on the pulp is referable to the newly opened tubules at the spreading margin of the carious process. The most severe pain of all comes from a pulp so damaged that it is about to die.

I find it difficult to reconcile these phenomena with Mr. Brown's law that I have quoted above. Why should pain sensation reside in nerves that are not even able to locate it properly? Why, if it has a protective function, should it gradually lessen instead of providing increasingly insistent warning of the exposure of dentine? And, finally, why should painful sensation be so acute in tissues normally completely protected against painful stimuli by the inert enamel and only operative when irreparable damage has been done (I am assuming that Nature did not envisage the advent of the dental surgeon)?—I am, etc.,

London, W.1. NORMAN J. AINSWORTH.

The Teaching of Anatomy

SIR,—I have been greatly interested in this correspondence and particularly in Dr. Smout's reminder (April 18, p. 505) that failure in diagnosis most often turns on failure of anatomical knowledge.

At middle age the question seems to me to be not only how much and what sort of anatomy should a student "do" or "take" but how much and what sort *can he be made to remember*. Anatomy, no matter how it is taught, is and always will be a "parrot subject"—i.e., it consists of learning a number of bare facts as distinct from other subjects like physiology, physics, and mathematics, which consist mainly of reasoned theory and hypothesis and are pieces of constructive thinking. Herein lies the whole difficulty. There are men who readily absorb facts, and these possessors of good memories will naturally believe in teaching all the anatomy, minutiae as well, since they have remembered it themselves (and, let it be realized, with enormous profit). The man, however, who likes thinking as distinct from remembering finds anatomy, as it was taught in my day, a weariness of the soul, and, when he has satisfied the examiner, turns with relief to more congenial pursuits to relieve his affronted mind, which jettisons all too much of the fearsome burden it has had thrust upon it. Yet a doctor must know his anatomy as an engineer must know his engine, and it seems to me to be puerile to deny that he can know too much of it. *It is failure in anatomy which is most often to blame for failure in diagnosis.*

If I could go over my education again in the light of my experience I would (since there is, as yet, no better way) do my anatomy as I did it, and, after I had done some of the post-graduate hospital work which I did, I would then go back to the dissecting-room and again go over the body, but not necessarily as an active dissector. This, in my view, is where we fail: we recognize the necessity for unremitting "practice" to keep up our medicine and surgery, and we ignore the same vital requirement with regard to the very foundation upon which almost all of it rests. We learn anatomy before we can truly appreciate its superlative importance, and, owing to its peculiar nature, we have forgotten most of it by the time we reach this realization. When, fairly late in professional life, I set to work to relearn a little anatomy I found it not only easier to learn but actually less uninteresting, and that, I am firmly convinced, because I truly appreciated its significance and had a mental background into which it fitted comfortably.

Inviting as the pruning and simplification of anatomy undoubtedly is, I regard it with fear and distrust, and that, be it marked, not as an erudite devotee but as one painfully aware of shortcomings. I feel that if this extremely risky experiment is to be made, it should be made only with the help of men expert in psychology and education, so that the residuum to be taught should not only contain *all* that is of real value but should be of such a nature or presented in such a way as to ensure that it will be remembered.

The solution, not only of this but of many other problems of medical education, might be a compulsory additional twelve months as a house officer in hospital after passing the final (with a "preliminary" registration) divided into four months each of medicine, surgery, and gynaecology (or obstetrics), with half-days spent in revision of anatomy and certain other obvious subjects before registration as a competent doctor. There is plainly much more to be said on the subject of medical education and, indeed, of medical practice, of which this anatomical question is but one aspect, but it would not be in place in a discussion of anatomy pure and simple. Is a symposium from leading teachers of various subjects in the medical curriculum and perhaps from others with something constructive to say a practical proposition? Something of the kind has been done in other scientific journals (notably the psychological ones) with considerable success.—I am, etc.,

Sheffield. A. KEFALAS.

Planning

SIR,—Several of your correspondents who write deprecating present discussion of post-war planning appear to think that this must of necessity detract from present effort towards winning the war. I cannot see that this conclusion is in any way justifiable, and believe that most of those who are actively engaged in one way and another in preparing reports for planning committees find time to do so without detriment to their present work.

All who have any interest in the development of a more efficient medical service after the war must inevitably find their thoughts turning frequently to the organization of that service; many of these have special knowledge of some branch of medicine, and could find some time to investigate and report on that field in which they have special knowledge. Surely, if this be so, it is better that preliminary investigation and research should be carried out now, and the foundations upon which post-war medicine can be built discovered, rather than that the end of the war should find the profession without one constructive idea for the future.

Since all that is at present possible is preliminary investigation and no final decision in any one field can be arrived at until some idea of the post-war social structure of the State is apparent, those members of the profession who are in the fighting Services and unable to participate in planning investigations, far from resenting such research, as Dr. Bayliss suggests (April 25, p. 539), could rightly accuse those of us who are still in civilian posts of wasting valuable time and delaying a final settlement if we do not actively pursue planning research now.—I am, etc.,

Alton, Hants. H. H. LANGSTON.

Preserving the Race

SIR,—I think it is fair to say that Dr. Miller Neatby (May 2, p. 565) takes me to task more for what he considers I implied than for what I actually wrote. Dr. Crichton-Miller's original question (March 7, p. 337) suggested that illegitimate children were usually liabilities rather than assets to the community, and that if we discouraged contraception we must choose between increasing these liabilities and legalizing abortion. I argued that no such dilemma exists, because society could turn many of the liabilities into assets either deliberately, by determining to do so, or by a change of attitude to the unmarried mother and her child resulting from an altered standard of values.

I did not advocate such a change. Everything must be paid for, and possibly the losses would outweigh the gains. But, since I am pressed, I will freely admit that kindness does seem to me to stand much higher in the scale of absolute values than sexual morality according to law, and appreciably higher than chastity in the best sense of the word. Alliteration apart and *pace* Macaulay, charity and chastity do often compete for priority in the minds of the virtuous sitting in judgment, and charity often loses. Both my humanity and my professional conscience have been shocked by the harsh treatment meted out to unmarried mothers and their children—treatment which, as we all know, ends frequently in the death of an infant which society regards as one who ought not to have been born. Surely the preservation of the family should rest on something better and more positive than this.—I am, etc.,

Hampstead. LINDSEY W. BATTEN.

A Pioneer of Open-air Treatment

SIR,—Your issue of May 2 gives an interesting and valuable account of the pioneer work of Henry MacCormac (1800–86) on the value of fresh air in prevention and cure of consumption. He was first cousin to my grandmother—Anna McClean (born Newsam)—and his wife was her sister. I remember him very well about 1870, and remember his insistence with all his relations that they must have their windows open at night—an insistence which we all obeyed.

To a child he was a somewhat terrifying presence, very tall and thin, with a great beak of a nose, very imperative speech, and an emaciated face. The latter was no doubt due to his extremely ascetic life. If we before this war ate three times the amount of meat good for us, the generation of Queen Victoria undoubtedly ate six times that optimum diet. Dr. MacCormac was not going to be such a fool. My mother has told me that he would have one mutton cutlet for his dinner and that she had seen him scrape hungrily every last fragment off the bone, but absolutely refuse the offer of another. She has also told me that, if a beggar of appealing woes happened to call at the house while dinner was being served, Dr. MacCormac would take his own plate out to him and go without meat for that meal. This corroborates your contributor's account of his sympathy for the poor.

His eldest son, Sir William MacCormac, had no children, but the grandchildren are well represented by the present Dr. Henry MacCormac and the Master of Trinity Hall, H. R. Dean, professor of pathology at Cambridge University, whose mother was sister to Sir William.—I am, etc.,

Cambridge. GEO. P. BIDDER.

Obituary

JOHN S. MORROW, O.B.E., M.D.

The sudden death of Dr. John Smyth Morrow has robbed Belfast of one of its oldest and best-known physicians. Entering the old Queen's College in 1884, he obtained the degree of B.A. (R.U.I.) in 1887, the M.B. in 1890, and M.D. five years later. He had thus been a member of the profession for upwards of half a century, a period marked by unprecedented advances in medical science and practice.

Soon after graduation he entered general practice in the north end of the city. To this work the young doctor brought ability, a characteristic enthusiasm, and unflagging industry, so that he soon found himself surrounded by a very large clientele. His rapid success was in no small degree due to his recognition of the developments which were following the great strides made by surgery and his close association with his school and college friends, John (afterwards Sir John) and Robert Campbell, the former a pioneer in gynaecology, the latter in general surgery. During the whole of his professional life he was a staunch supporter of the Belfast Medical School, more especially when in 1908 Queen's University replaced Queen's College. One of the oldest members of Convocation, he was a foundation member of Queen's University Association, of which he was the first treasurer and of which he afterwards became president. At the time of his death he was a representative of Convocation on the Senate of the university. He had a long connexion, too, with the work of the Royal (afterwards the Royal Victoria) Hospital, serving it first as house-surgeon and house-physician, and from 1903 till 1930 as a physician on the visiting staff. Upon his retirement at the age limit he became a member of the Board of Management. An intimate friend of Lord Pirrie and Lady Pirrie, he was their trusted adviser when, largely by their influence and munificence, funds were collected and the hospital was rebuilt on its present site. This friendship with Lord Pirrie also secured for him the post of medical adviser to the shipbuilding firm of Harland and Wolff, and his work here afforded him a unique experience of industrial injuries. When the Workmen's Compensation Act became law and the firm took on its own insurance he found himself in a most important position in the firm. In addition to supervising the treatment of injured workmen he endeavoured to minimize the dangers incidental to their work, whilst one of his most interesting duties required him to go to sea for the trial trips of most of the famous liners which were built by the firm since the beginning of the twentieth century.

In recent years Dr. Morrow's main activities were directed to the problems arising from industrial injuries, though as long ago as the session 1914–15, when he was president of the Ulster Medical Society, he chose for his address, "Disease in its Medico-Legal Relation to Accident." Since then many of the best-known insurance companies engaged in this type of practice retained him in legal cases, so that he was well known in the Law Courts and highly respected by Bench and Bar alike. In 1915 Dr. Morrow volunteered, and was accepted, for active service. He held the rank of major, R.A.M.C., and was posted as consultant in medicine. After enlistment he travelled to the Mediterranean on the hospital ship *Britannic*. For his distinguished work during the war he was awarded the O.B.E.

The British Medical Association always found in Dr. Morrow an active and loyal member. For many years he held a seat on the Northern Ireland Council and was president of the Northern Ireland Branch in 1926–7. When the Association met in Belfast in 1909 he was hon. secretary of the Section of Medicine. For the Association Meeting of 1937 Mrs. Morrow was chairman of the Ladies' Reception Committee and organized the various functions which had so much to do with the social success of this meeting. In private life Dr. Morrow had travelled widely and had visited many countries. On holiday John S. (as he was familiarly known) was a cheerful and amusing companion, with a rich fund of reminiscences of the doings of his teachers and contemporaries. Some he had committed to rhyme. At social functions of a medical kind his recitation of "The Country Doctor" was nearly always demanded and met with universal applause.

Dr. RICHARD R. LEEPER, medical superintendent of St. Patrick's Hospital, Dublin, who died on March 25, came of medical stock and qualified in 1886, proceeding four years later to the Fellowship of the Royal College of Surgeons in Ireland. He had a distinguished undergraduate career, and acted for two years as demonstrator in anatomy under the celebrated Prof. D. J. Cunningham. After several years of experience in psychiatry and eight years in private practice in Co. Wicklow he took up his life's work at St. Patrick's Hospital, which he brought to the highest pitch of efficiency. After acting from 1911 to 1929 as honorary secretary to the Irish Division of the Royal Medico-Psychological Association, he became the first chairman of the Irish Division. In 1931 he received the well-merited honour of being elected to the presidency of the association, and the annual meeting held that year in Dublin was a signal success. In 1916 he was appointed Lord Chancellor's Visitor in Lunacy, and for many years he acted as examiner in mental diseases to the National University of Ireland. Dr. R. Thompson, medical superintendent of Armagh Mental Hospital, writes: "By the passing of Dr. Leeper, Dublin loses one of its outstanding personalities and the world of psychological medicine a distinguished leader. For more than forty years he had been medical superintendent of that historic institution St. Patrick's Hospital, in whose history and traditions, as well as that of its famous founder—Jonathan Swift—he was so deeply versed. As one who had the privilege of working with Dr. Leeper for some eleven years I find it indeed difficult to realize that that buoyant, vigorous, forceful personality has passed from this scene. His interest in life was vivid and infectious. Not only was he a superb administrator—adding almost yearly some new wing or improvement to the hospital—but he had to a supreme degree the faculty of getting the very best out of those who worked for him. Appreciation and encouragement he gave liberally, while if criticism was necessary it was forthright and never carping. Only those who lived in intimate contact with him could appreciate fully Leeper's many-sidedness."

Mr. GEORGE MCNEILL died on April 1, the day after his 64th birthday. Graduating M.B., Ch.B. at Edinburgh in 1902, he subsequently worked at Morningside Mental Hospital under Sir Thomas Clouston. Later he took the F.R.C.S.Ed. with anatomy as his special subject, and became assistant to the professor of anatomy at St. Andrews University. From 1909 to 1912 he was surgeon to the Rio Tinto Mines in Spain, where he had ample opportunity to develop his capacity for surgery. During the last war he served in France as surgeon to a Base Hospital at Etaples, and later, after being invalided for an abdominal injury, as surgeon to the Lord Derby Memorial Hospital at Winwick. In 1920 he began work under the Ministry of Pensions in various hospitals, becoming in 1928 the first medical superintendent of the Ministry's hospital at Dunston Hill, Gateshead, remaining in that capacity until his death, with the exception of the one year 1938-9, during which he was placed on duty at Roehampton as limb-fitting surgeon. G. H. writes: Though he knew full well two years ago that the condition from which he was suffering could have but one end, George McNeill remained in active charge of his hospital until three days before his death. During the last few months he exhibited a most remarkable spirit and courage in his work, and to those who knew of his difficulties he was a great source of inspiration in his triumph over physical disabilities. His memory will be cherished by all who had the privilege of serving under him in the hospital, where his great influence produced harmony among patients and all sections of the staff. He is survived by a widow and three sons, of whom the two youngest are studying medicine.

Dr. JOHN WILLIAMS HILLIARD died in Durban, South Africa, on April 4, aged 66. He was a member of a well-known Co. Kerry family, and practised in Blackpool for many years before his retirement in 1929. Educated at Trinity College, Dublin, he obtained the M.A. and M.D. degrees in 1901. After graduation he held a varied series of house appointments in Dublin. He then went to Blackpool, where his elder brother, Dr. Ephraim Hilliard, had already been in general practice for many years. His outstanding abilities soon gained for him an extensive general and ophthalmic practice. He was appointed medical officer to the Victoria Hospital, Blackpool, in 1914, and for two years served as chairman of the Medical Board. At the time of his death he held the post of senior honorary consulting surgeon. Dr. J. W. Hilliard joined the R.A.M.C. in 1915, and served in Egypt and Mesopotamia, where his ophthalmic experience was quickly recognized by a specialist appointment. On his return from war service he was appointed medical referee to the Ministry of Pensions for the Blackpool and Fylde areas. A keen and skilful exponent of winter sports, he spent many holidays in Switzerland. His outstanding

characteristics were integrity and culture. He had a wide knowledge of medicine and surgery, and was a skilful operator in general and ophthalmic surgery. Though of a retiring disposition he was an attractive conversationalist, and he will be sadly missed by those who had the privilege of knowing him intimately. He was a member of the B.M.A. for many years. His wife, who survives him, is a daughter of the late Alderman Thomas McNaughtan, M.D., second Mayor of Blackpool.

Dr. R. KING BROWN, formerly M.O.H. for Bermondsey, died on April 28 at his home at Goring-by-Sea, Sussex. He was born at Athlone, Co. Roscommon, on February 16, 1864, and was educated at Coleraine and the University of Belfast, graduating B.A., M.B., B.Ch. of the old Royal University of Ireland in 1891, and M.D. (with gold medal) in 1903; he also took the D.P.H. of the English Conjoint Board. During his term of office as head of the health department of the Metropolitan Borough of Bermondsey Dr. King Brown lectured on public health at Guy's Hospital and examined for the M.D. in State Medicine of London University. He had travelled widely and knew German well, and translated into English the book by Dr. Bernhard of St. Moritz on *Sunlight in Surgery*. An early worker in actinotherapy, he edited the English edition of Bach's *Bestrahlung mit Quartzlampe*, and also translated Schliephake's *Short-wave Therapy*; he was editor for some years of the *British Journal of Physical Medicine*. Dr. King Brown joined the B.M.A. in 1903, was chairman of the Camberwell Division in 1924-5, and served later on the Practitioners of Physical Medicine Group Committee.

The death is announced of Dr. REGINALD JOSEPH WHITE, chief gynaecologist to the St. Vincent Hospital, Dublin, and consulting gynaecologist to the National Maternity Hospital, Holles Street, Dublin. He was educated at Clongowes and the old Royal University of Ireland, and took the Irish Conjoint qualifications in 1899 and the F.R.C.S.I. diploma in 1901. Dr. White was a former Master of the National Maternity Hospital, and up to the time of his death was lecturer in gynaecology at the National University Medical School. He had been an examiner for the Central Midwives Board for Ireland and president of the Infant Aid Society, and joined the B.M.A. in 1932. A keen sportsman, he was particularly interested in fishing and shooting.

We regret to announce the death in Barcelona of Prof. MANUEL CORACHAN, one of the most brilliant personalities of contemporary Spanish surgery. He was the leading figure of the Catalan school of surgery and also an outstanding figure of the three Peninsular centres—Lisbon, Madrid, and Barcelona. He was the organizer of the Spanish Association of Surgeons, which brought together the majority of the Peninsular surgeons. Among his numerous publications his book on gastric surgery will probably stand as one of the most complete on that subject. He also contributed to the work of the Portuguese in arteriography; his manual dexterity was second to none. After being in exile for some years, a victim of the Spanish War, in which he lost a son, a surgeon of remarkable ability, Corachan was allowed to return to his country. He then left the University of Caracas, Venezuela, where he had been appointed professor of surgery during his exile. A few months after his return to Barcelona he fell a victim to the typhus which led to his tragic death. The passing of Corachan is a serious loss to Spanish and Latin-American surgery.

Dr. G. F. McCleary writes from New York City: May I add to the obituary notice of my old friend Dr. A. K. CHALMERS in your issue of Feb. 7 a few notes on his pioneer work in maternity and child welfare. He was a prominent worker in this field of public health 40 years ago, and was one of the three British medical officers of health who attended the first International Congress of Infant Welfare, which was held in Paris in October, 1905, the other two being Dr. Moore of Huddersfield and myself representing Battersea. It was in a railway carriage in Northern France, during an excursion in connexion with the Congress, that the first British National Conference on Infant Mortality was engendered. The British delegates to the Paris Congress, about a dozen in number, addressed a round robin to Mr. B. Broadbent, mayor of Huddersfield, and Baillie W. F. Anderson, chairman of the Glasgow Health Committee, who were among the delegates, asking them to move their respective authorities to convene a British national conference on infant welfare in the following year. On their return home these distinguished administrators at once got to work, and the conference was held in London in June, 1906, under the presidency of Mr. John Burns, then President of the Local Government Board, who delivered a dynamic address. This conference marked an epoch in the movement for the preservation of child life—perhaps the most demonstrably successful movement for social amelioration of the present century. In 1906 Chalmers organized in his department a section specially devoted to child welfare, which was remarkable for the scope and efficiency of its agencies. I have given some account of his work for mothers and children in my book, *The Early History of the Infant Welfare Movement*, published in 1933. The last time I saw my old friend was at the Oxford Meeting of the B.M.A. in 1936. His mind was as active as ever; he talked of his child welfare work and recalled the events of the Paris Congress 31 years earlier. Almost his last words to me were: "I am glad I was associated with the movement in its early stage. It was work that was well worth doing."

An obituary notice of SIDNEY FORSDIKE, M.D., F.R.C.S., appeared in the *Journal* of April 18. A correspondent now sends some further particulars of his career. Mr. Forsdike was born at Cardiff on November 6, 1875, and before coming to London to study medicine was educated at Llandovery College. After qualification he was for some years in general practice, first at Chatham and then at Porthcawl, Glam. He served in South Africa with a Welsh regiment all through the Boer War, and for a large part of the war of 1914-18 held a commission in the R.A.M.C., at Netley and Bournemouth. He was invalided out of the Army at the end of 1917, and finally retired from gynaecological practice in 1936, except for the honorary appointment he held at the Princess Beatrice Hospital, Kensington.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

At a Congregation held on May 1 the following medical degrees were conferred by proxy: M.D.—K. O. Black; M.B., B.Chir.—W. S. Rhodes. During April titles of the degrees of M.B., B.Chir. were conferred by diploma on Mrs. K. Ferguson.

Applications for the Marmaduke Sheild Scholarship in Human Anatomy must be sent to the Registrary by May 30. Persons eligible are undergraduates (men or women) of not more than three years' standing from matriculation, and B.A.s of not more than four years' standing from matriculation who have completed the First M.B. Examination and are qualified in anatomy and in physiology to proceed to the Final M.B., and have also obtained honours in Part I of the Natural Sciences Tripos with anatomy as one of their subjects. Candidates for the Michael Foster Studentship in Physiology should send their applications, with a statement of the course of research they propose to undertake, to Prof. Adrian, Physiological Laboratory, by July 6.

UNIVERSITY OF EDINBURGH

The Curators of Patronage of the University have appointed John Henry Gaddum, Sc.D., M.R.C.S., at present professor of pharmacology at the College of the Pharmaceutical Society of Great Britain, to the chair of materia medica rendered vacant by the death of Prof. A. J. Clark.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

At a meeting of Council held on April 25, with the President, Prof. W. Fletcher Shaw, in the chair, F. Neon Reynolds (London) was formally admitted to the Fellowship.

W. J. H. M. Beattie (London) and C. M. Gwillim (London) have been elected to the Fellowship, and the following were admitted to the Membership:

V. H. Barnett (R.A.M.C.), H. H. Fouracre Barns (R.A.F.), Mary A. M. Bigby (London), A. B. Concanon (London), Mary D. Daley (London), M. L. Gaudin (R.A.F.), L. A. Ledingham (London), K. M. MacKenzie (Sheffield), Lilian M. N. Raftery (London).

At the annual general meeting of the College, held on April 25, with the President in the chair, the following were elected to Council in place of those retiring by statutory rotation: *Representatives of the Fellows:* W. Gilliatt (London), A. M. Claye (Leeds), E. C. Fahmy (Edinburgh), C. H. G. Macafee (Belfast); *Representatives of the Members:* A. C. H. Bell (London), H. R. MacLennan (Glasgow).

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—G. K. Coombes, T. W. Renton, R. M. B. Talbot, J. J. Wild.
MEDICINE, PATHOLOGY, AND FORENSIC MEDICINE.—F. G. Brindley, J. A. Dodds.
MIDWIFERY.—R. A. Bush.

The diploma of the Society has been granted to G. K. Coombes and J. A. Dodds.

The Services

Col. H. E. Shortt, C.I.E., I.M.S., has been appointed Honorary Physician to the King, vice Major-Gen. P. S. Mills, C.I.E., I.M.S. (ret.).

Col. J. S. S. Martin, I.M.S., has been appointed Honorary Surgeon to the King, vice the late Col. E. G. Kennedy, I.M.S.

The D.S.O. has been awarded to Acting Surg. Cmdr. D. MacK. Craig, R.N.V.R., for gallantry and skill in the Battle of Crete, while serving in H.M.S. *Dido*.

CASUALTIES IN THE MEDICAL SERVICES

Major ROBERT LOUIS FROST, I.M.S., is recorded as "Died" in an India Office Casualty List published on April 30. He was born on April 26, 1898, and entered the Indian Army in 1917 as lieut. in the 120th Infantry. He was one of the many young officers "axed" after the war of 1914-18, and retired with a gratuity in 1923. He then entered Guy's Hospital, took the M.R.C.S., L.R.C.P. in 1929, and was appointed to the I.M.S. in August of that year, being ranked as capt. from August, 1926. He had been a member of the B.M.A. since 1931.

In the same Casualty List Capt. P. A. Narayan, I.M.S., and Lieut. L. K. Allen, Indian Medical Department, are also posted as "Died."

Lieut. EDWARD GEORGE WILLIAM LYNCH, I.M.S., who lost his life on active service in March, was the elder son of Mrs. Lynch and the late Dr. L. E. Lynch. He was educated at the University of Dublin, where he graduated M.B., B.Ch., B.A.O. in 1940, and entered the I.M.S. at the end of that year.

Wounded.—Lieut.-Col. J. L. O'Neill, I.M.S.; Capt. E. V. Parker, R.A.M.C.

Missing.—Capt. J. A. Glover, R.A.M.C.; Major N. I. McLeod, I.M.S.

Prisoner of War.—Asst. Surg. J. F. T. O. Nazareth, Indian Medical Department.

DEATHS IN THE SERVICES

Col. CHARLES ALFRED WEBB, late R.A.M.C., died at Walton St. Mary, Clevedon, on April 17, aged 84. He was born at Wimborne on Jan. 1, 1858, was educated at Wimborne School and St. George's Hospital, and took the M.R.C.S. and L.S.A. in 1879 and the D.P.H. in 1887. Entering the Army in 1880, he became colonel in 1905 and retired in 1908. He served in the Nile campaign of 1898, when he was present at the Battle of Omdurman, was mentioned in dispatches, and received the medal and the Egyptian war medal with a clasp. After retirement he was employed as staff officer to the R.M.O. of the Wessex Division, R.A.M.C.(T.A.), from 1909 to 1913. He also rejoined for service in the war of 1914-18. He had been a member of the B.M.A. for 59 years.

Col. GERALD THOMAS RAWNSLEY, C.B., C.M.G., late R.A.M.C., died at Malta on April 15, aged 76. He was born at Charlton, Kent, the youngest son of the late Lieut.-Col. T. J. Rawnsley, A.O.D., was educated at Cranbrook School and Guy's Hospital, and took the M.R.C.S. and L.S.A. in 1886. Entering the Army as surgeon in 1887, he became col. in 1915, went on half-pay in Sept., 1919, and retired in Nov. of the same year. He served throughout the war of 1914-18, latterly as D.D.M.S. of the 12th Army Corps. He was mentioned in dispatches four times, and received the C.M.G. in 1916 and the C.B. in 1918. He was also a Knight of Grace of the Order of St. John of Jerusalem.

Lieut.-Col. HERBERT HERBERT, I.M.S. (ret.), died on March 19. He was born in 1865, the son of Richard Sherwood, barrister, of Tranmere, Cheshire, but later changed his surname to Herbert. He was educated at the University of Leeds and qualified in 1886 and became F.R.C.S. in 1891. Entering the I.M.S. as surgeon in 1887 he attained the rank of lieutenant-colonel and retired in 1907. He served in Somaliland in 1890, receiving the medal with a clasp. In 1897 he was appointed ophthalmic surgeon to the J.J. Hospital, Bombay, and professor of ophthalmic surgery in the Grant Medical College, Bombay. After retirement he continued to practise his specialty and was appointed surgeon to the Nottingham and Midland Eye Infirmary. He was a member, and for a time vice-president, of the Ophthalmological Society of the United Kingdom. In the war of 1914-18 he served in a hospital ship and in the Indian hospital at Brockenhurst. After the war he moved to Worthing, where he was ophthalmic surgeon to Worthing Hospital and consulting pathologist to the Sussex Eye Hospital, Brighton. He was the author of several works on ophthalmology: *Practical Details of Cataract Extraction* (1903), *Cataract Extraction* (1908), and *Operative Treatment of Glaucoma* (1923). He had been a member of the B.M.A. for forty-seven years.

Lieut.-Col. JAMES LESLIE MARJORIBANKS, I.M.S. (ret.), died in Edinburgh on March 25, aged 67. He was educated at Edinburgh, where he graduated M.B., C.M. in 1896 and M.D. in 1904, also taking the D.P.H. of the Scottish Colleges in 1904. Entering the I.M.S. on July 28, 1897, he became lieut.-col. after twenty years' service, and retired on Nov. 28, 1925. Most of his service was spent in civil employ in the Bombay Presidency, where he became a Deputy Sanitary Commissioner in 1903. During the war of 1914-18 he was on military duty 1915-19. After the war he served as port health officer and medical officer of the European General Hospital at Aden.

Lieut.-Col. LEONARD HIRSCH, C.I.E., I.M.S. (ret.), died in London on April 23, aged 62. He was born on Aug. 19, 1879, was educated at Guy's Hospital, and took the M.R.C.S., L.R.C.P. in 1901 and the F.R.C.S.Ed. in 1914. He entered the I.M.S. as lieut. in 1902, became lieut.-col. in 1922, and retired in 1924. He served throughout the war of 1914-18, and in 1919 received the C.I.E. for his services. He lived at Llandrindod Wells. He had been a member of the B.M.A. for 25 years.

Lieut.-Col. ALASTAIR TAIT, I.M.S., died in India of pneumonia on April 11, aged 42. He was born on Jan. 1, 1900, and was educated at the University of Aberdeen, where he graduated M.B., Ch.B. in 1922. He joined the I.M.S. as lieut. in 1923, and became major in 1935. He had been a member of the B.M.A. since 1926.

Lieut.-Col. ROBERT JOHN MARKS, Bengal Medical Service (ret.), died at Boscombe, Bournemouth, on March 23, aged 79. He was born on Oct. 10, 1862, the son of Mr. Robert Marks, schoolmaster, of Gillingham, Kent, educated at Bristol, and took the M.R.C.S. and L.S.A. in 1886. Entering the I.M.S. on March 31, 1887, he became lieut.-col. after twenty years' service, and retired on Feb. 26, 1918. Most of his service was spent in civil employ in the North-West, now the United, Provinces. He served on the N.E. frontier of India in the Lushai campaign of 1891, and on the N.W. frontier in the campaign of 1897-8 in the Tochi Valley, gaining the frontier medal with a clasp.

Medical Notes in Parliament

Medical Evidence in Pension Claims

Mr. RHYS DAVIS, on April 29, drew attention to the case of a man, passed A1 into the Forces, who was sent to France, brought home, sent to a military mental hospital for six weeks, taken home for a fortnight, and then certified permanently as a lunatic. A claim for pension or allowance had been refused. Mr. Davies challenged the title of the Government to determine a man's right to pension on medical evidence alone. The Ministry of Pensions, he said, relied exclusively on what the doctor said to the Minister, and that doctor was paid by the Minister for giving that evidence. Mr. Davies cited another case, and said he had been told by the South-East Lancashire Mental Association's chief official that medical boards were passing registered mental deficients into the Forces. Mr. Davies added that he communicated with the chiefs of the Ministry of Labour and National Service, who were astonished to find that this was so. Sir WALTER WOMERSLEY said that since the rush of the early days of the war medical boards had been set up under the Ministry of Labour, and the better examination of recruits had much reduced the number of cases with which the Ministry of Pensions had to deal. There were bound to be cases which no clinical examination could discover. Cancer, in particular, was giving him difficulty. Medical opinion throughout the country said it could not be ascribed to any service. Cases occurred in the civilian population among young people and in the Services too. If a man had been passed as A1 into the Army and the medical board was satisfied that he was indeed a fit man, and if he were afterwards discharged for some constitutional disease and there was any degree of aggravation at all, this brought the case within the provisions of the Royal Warrant. That provision had been announced last July, and since then the Ministry had been able to accept over 70% of the cases for pension purposes. In the Department the case was dealt with by expert laymen and not by medical men. These laymen were bound to seek the advice of the medical branch of the Ministry, because the majority of these cases hung on the medical evidence. The doctors in the Department worked under the instruction that they must look into each case with a view to giving a pension and not refusing it. If a man submitted a certificate from his own private doctor or from a panel doctor which gave a different opinion from that of the Ministry's doctors, Sir Walter passed the case immediately to the nominee

of the President of the Royal College of Surgeons or of Physicians. Many of these nominees' decisions had been in favour of the men's doctors. In any case the opinion was as fair as it was possible to get. Sir Walter said he would welcome tribunals of appeal, but one medical man must sit on each. He was told by all the Government Departments, including the Ministry of Health, as also by Mr. Shakespeare's committee, that doctors were not available. That was the only reason that tribunals were not set up. The number of doctors required was large, and he would set up the tribunals as soon as that step was practical.

In response to Sir Ian Fraser on April 30, the Minister gave an assurance that no member of the Forces was asked to sign any form respecting his health on discharge which might prejudice his applying for a pension or submitting a claim to an appeals tribunal at a later date.

Precautions against Typhus

In answer on April 30 to Sir Percy Hurd, Mr. BROWN said that the prevalence of typhus in certain parts of Europe called for continuance of precautions described by him on March 26. All port health and riparian authorities were advised to secure that all persons on board any ship arriving from a Continental or North African port, including the crew, should be medically inspected at the first port in this country at which passengers or members of the crew disembarked. If verminous conditions were found the authority had adequate powers for dealing with them. Mr. Brown added that he proposed to send to local authorities at an early date a circular with suggestions for the co-ordination of their resources for dealing with parasitic conditions, with special reference to the powers given to them under the Scabies Order, 1940. Sir FRANCIS FREMANTLE asked what action was taken with entrants from Ireland. Mr. BROWN replied that there was no sign of typhus in Ireland. If there were any sign the same procedure would apply.

Diphtheria in Scotland

On May 5 Mr. JOHNSTON, in reply to Mr. Leach, said that during 1941 there were in Scotland 996 cases of diphtheria among immunized children, of which one was fatal, and about 7,000 among non-immunized children, of which 418 were fatal. Children were included in the immunized group if they had a full course of inoculation, although complete immunization did not develop until 3 months after the last inoculation. Children who had only a single inoculation were not included in the immunized group.

Tuberculosis Mortality

On May 7 Mr. BROWN informed Mr. Gallacher of the number of deaths in England and Wales from respiratory tuberculosis and other forms of the disease, also from tuberculous meningitis, in the years 1938, 1939, 1940, and 1941, as follows:

	1938	1939	1940	1941 (Provisional)
Respiratory tuberculosis:				
Males	12,445	12,702	13,920	13,986
Females	8,837	8,340	9,740	9,648
Other forms of tuberculosis, including tuberculous meningitis:				
Males	2,261	2,229	2,381	2,652
Females	1,996	1,852	2,103	2,384
Tuberculous meningitis:				
Males	918	868	957	1,196
Females	873	816	929	1,170

Comparable figures for Scotland were furnished on the same date by Mr. JOHNSTON:

Year	Respiratory Tuberculosis		Tuberculous Meningitis		Other Forms of Tuberculosis	
	Males	Females	Males	Females	Males	Females
1938	1,396	1,185	198	192	237	224
1939	1,506	1,211	193	184	218	214
1940	1,669	1,368	242	243	244	237
1941	1,645	1,472	267*	300*	249*	242*

* These figures are provisional.

House Posts before Enlistment

In reply to a question by Sir Ernest Graham-Little, Mr. ERNEST BROWN said that the arrangement under which a period of hospital work after qualification was required before admission to the medical branches of the Forces was made at the request of the Service Departments, and had been in operation since the early days of the war. Concurrently with this arrangement, all newly qualified practitioners were encouraged by the Central Medical War Committee to take hospital appointments instead of going into private practice, and if they failed without reasonable cause to take such an appointment they were liable to be directed to do so by a national service officer under Defence Regulation 58A.

"Call-up" of Tuberculosis Officers.—One full-time tuberculosis officer in London, and nine in the rest of England and Wales, have been recruited for the medical branches of the Forces on the recommendation of the Central Medical War Committee. In each instance Mr. Brown was advised that suitable alternative arrangements could be made by the employing authorities. In five of the cases, one in London and four elsewhere, recruitment was delayed for varying periods for this purpose.

Pensions Appeals Tribunals.—Answering Sir Ian Fraser on April 23, Sir WALTER WOMERSLEY said he had asked the Ministry of Health for doctors for pensions appeals tribunals, but he had been informed that the necessary number could not be supplied at present. Sir Ian Fraser suggested that a number of older doctors who had served in the last war could undertake this work. The Minister said the committee under Mr. Shakespeare had thoroughly investigated the medical personnel available, and had reported that the medical men were not available. He could not say without notice how many doctors were required.

Report of Silicosis Investigation.—Sir JOHN ANDERSON, on April 28, told Mr. J. Griffiths that there had been some unexpected delay in the final stages of the publication of the report on the investigation into silicosis among coal-miners, as a result of war conditions. Copies should be available for issue, however, by May 18.

Notes in Brief

Mr. Brown stated on April 30 that there was no obligation on the part of an insurance doctor to furnish medical reports to a patient's employer in compensation cases. He said he had no reason to think that insurance doctors needed instruction in the matter.

The proportion of pre-packed drugs sold to the public other than through registered chemists is in some quarters, says Mr. Ernest Brown, estimated at about 25 or 30%. He had no information on which to base an official estimate.

Inquiries have been made into the practicability of the wider use of edible seaweeds for human consumption, but the Ministry of Food is advised that their nutritive value is not sufficient to justify the expense of collection and distribution.

Major Lloyd George has stated that approximately one-fifth of the vitamins in the wheat grain is left out in the milling of national wheatmeal. It is impossible to compare national wheatmeal with the high-extraction flours of the last war, because the latter were not prepared according to a precise specification and they were often diluted with other cereals.

Medical News

The annual meeting of the Canadian Medical Association will be held at Jasper Park, Alberta, from June 15 to 19.

The next quarterly meeting of the Royal Medico-Psychological Association will be held at Preston County Offices on Wednesday, May 20, at 10.30 a.m., when there will be a discussion on "Ear, Nose, and Throat Diseases in Mental Disorder and Collaboration in its Investigation and Treatment," to be opened by Mr. H. G. Bedford Russell, Mr. W. Stirk Adams, Dr. J. J. Craig, Dr. F. A. Pickworth, and Dr. H. F. Fenton.

A meeting of the Medico-Legal Society will be held at 26, Portland Place, W., on Thursday, May 28, at 5.45 p.m., when a paper will be read by Mr. C. E. A. Bedwell on "Medical Members of the Inns of Court—An Historical Survey."

The whole-day conference on Problems of Collective Feeding in Wartime arranged by the Nutrition Society will be opened by Lord Woolton at 11 a.m. on Saturday, May 30, at the London School of Hygiene, Keppel Street, W.C. It will include discussions on the organization of mass catering, on food supplies for collective feeding (to be opened by Prof. J. C. Drummond), on effects of large-scale preparation on nutritional values, and on the general dietetics of communal feeding.

A one-day conference on maternity and child welfare, arranged by the National Association of Maternity and Child Welfare Centres and for the Prevention of Infant Mortality on behalf of the National Council for Maternity and Child Welfare, will take place on July 3 at B.M.A. House, Tavistock Square, London, W.C.1. The Minister of Health has consented to act as president and to give the opening address. Sir Alexander Macgregor, M.D., will act as chairman of the conference. The subject chosen for discussion is: Mothers and woman-power in relation to (*a*) industry, (*b*) nurseries, foster-mothers, and daily minders, (*c*) the Women's Services, (*d*) education for parenthood. Admission will be by ticket, price 2s. 6d., which may be obtained from the secretary, N.A.M.C.W.C. and P.I.M., 117, Piccadilly, W.1.

Dr. E. D. Adrian, F.R.S., professor of physiology at Cambridge, delivered the seventh annual Hughlings Jackson memorial lecture of the Montreal Medical Institute on Feb. 27, his subject being "Sensory Areas of the Brain."

The quarterly court of the directors of the Society for the Relief of Widows and Orphans of Medical Men was held on April 8, with Mr. V. Warren Low, president, in the chair. The audited accounts for the year ended Dec. 31, 1941, were presented and approved. It was reported that two of the widows in receipt of grants had died: one had been on the funds for 32 years and had received £2,400 in grants; her late husband had paid £39 18s. in subscriptions. The other had been on the funds for 23 years and had received £1,770 in grants, her late husband having paid £52 10s. in subscriptions. Only widows or orphans of deceased members of the society are eligible to receive relief. Membership is open to any registered medical man who at the time of his election is residing within a twenty-mile radius of Charing Cross. Full particulars can be had from the secretary, 11, Chandos Street, Cavendish Square, W.1. The annual general meeting will be held on May 20 at 5 p.m.

The 70th anniversary of the foundation of the *Union Médicale du Canada*, which has been fused with the *Bulletin de l'Association des Médecins de Langue Française de l'Amérique du Nord*, was celebrated in January.

The London County Council announces that Lieut.-Col. Andrew Topping, M.D., its deputy medical officer of health, has been appointed director of the London Ambulance Services. Col. Topping is now engaged part-time on a survey of hospitals for the Ministry of Health, and his new duties will be so arranged as not to interfere with this work.

The Ministry of Food invites the attention of medical practitioners to the fact that, following discussions with the Food Rationing (Special Diets) Advisory Committee of the Medical Research Council, information respecting the position of sick persons under the soap rationing scheme will shortly be available at local food offices. This information will only be available for medical practitioners, and will be supplied on request.

The William Gibson Research Scholarship for medical women will be awarded this year, and applications should be received by the secretary of the Royal Society of Medicine, 1, Wimpole Street, W.1, not later than June 1.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* there were 585 fewer cases of measles than in the preceding week, this being the first decrease for thirteen weeks. In London, Surrey, Middlesex, Warwickshire, Lancashire, and Northumberland there were 91, 64, 204, 75, 82, and 88 fewer cases than in the preceding week, but in the three other counties where measles has been prevalent—Kent, Essex, and Durham—there were small rises.

Notifications of whooping-cough were 117 more than in the preceding week. In the counties of Kent, Essex, and Yorks West Riding the number of cases rose by 43, 31, and 51 respectively.

There were 23 fewer cases of dysentery. New outbreaks occurred in Bucks, Aylesbury R.D. 20, and Caernarvonshire, Conway M.B. 11 cases; 67 cases were recorded in Yorks West Riding, Bradford C.B., where there had been 59 in the preceding week. Additional cases were reported in local outbreaks in Surrey, Coulsdon and Purley U.D. 7, and Leicestershire, Leicester C.B. 9. The 18 cases notified in London during the week were contributed by ten boroughs. Of the 18 cases of paratyphoid notified during the week, 8 were reported from Somerset, Weston-super-Mare M.B.

In *Scotland* the figure for measles rose to 516 cases—64 more than the previous week. In Glasgow there were 400 new cases, compared with 296 in the previous week; but in Edinburgh, with 77 cases, there was a decrease of 26. Notifications of whooping-cough rose by 53 to 100, the only large outbreak being that of Glasgow with 59 cases.

In *Northern Ireland*, in the City of Belfast, the incidence of measles has been steadily increasing during the past five weeks; 75 cases were notified during the week reviewed.

Returns for the Week Ending May 2

The notifications of infectious diseases in England and Wales included the following: scarlet fever 1,005, whooping-cough 1,623, diphtheria 743, measles 4,006, acute pneumonia 813, cerebrospinal fever 149, dysentery 160, paratyphoid 13, typhoid 10.

No. 16

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended April 25, 1942.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1942					1941 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	170	12	32	4	8	326	18	77	4	14
Deaths		1	—				1	7		
Diphtheria	750	47	162	41	33	877	46	222	36	27
Deaths	25	—	2	—	—	1	1	4	1	2
Dysentery	185	18	58		3	131	21	32		—
Deaths		—		—	—		—		—	—
Encephalitis lethargica, acute	3	—	—	—	—	3	—	—	—	—
Deaths		—	—				—	1		
Enteric (typhoid and paratyphoid) fever						26	2	45	7	2
Deaths						1	1	1	1	—
Erysipelas			50	9	2			54	9	1
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years	—			31						
Deaths	35	3	9	7	4	28	4	4	3	2
Measles	3,502	297	616	138	75	13,951	319	106		10
Deaths	2	—	1	1	1	16	—	—	1	—
Ophthalmia neonatorum	83	5	17	—	—	78	9	22	—	—
Deaths										
Paratyphoid fever	18	—	2		—					
Deaths	—		—		—					
Pneumonia, influenzal*	951	56	11	9	—	1,156	50	20	4	2
Deaths (from influenza)	20	1	—	—	—	51	6	4	5	2
Pneumonia, primary	—	—	296	19		—	—	336	16	
Deaths		—		16	10		30		12	10
Polio-encephalitis, acute	4	1				—	—			
Deaths		—					—			
Poliomyelitis, acute	2	—	1	1	—	7	—	—		2
Deaths		—					—			
Puerperal fever	—	—	16	—	—	1	1	10	4	2
Deaths		—					—			
Puerperal pyrexia	186	15	16		1	146	11	23		2
Deaths	—	—				—	—			
Relapsing fever	—	—			—	—	—			—
Deaths		—					—			
Scarlet fever	1,031	46	172	37	27	1,056	50	126	38	25
Deaths	—	—	—	—	—	—	—	2	—	—
Small-pox	—	—	—		—	—	—	—	—	—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever	8	—	3	10	—					
Deaths	1	—	—	—	—					
Typhus fever	—	—	—	—	—	—	—	—	1	—
Deaths			—	—	—			—	—	—
Whooping-cough	1,672	202	100	55	12	3,568	96	219		9
Deaths	15	6	1	3	—	36	—	10	1	—
Deaths (0–1 year)	352	37	74	38	18	429	41	77	29	20
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,565	650	637	217	130	6,744	1,054	749	233	251
Annual death rate (per 1,000 persons living)			14·3	14·5	†			16·3	15·5	22·0
Live births	6,089	592	951	316	294	4,984	345	889	279	164
Annual rate per 1,000 persons living			19·7	21·1	†			18·1	18·5	14·4
Stillbirths	258	33	46			213	14	50		
Rate per 1,000 total births (including stillborn)			41					53		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Letters, Notes, and Answers

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QUERIES AND ANSWERS

Removal of Tattoo Marks

DR. ALFRED A. MASSER writes: Could any of your readers suggest a method of removing a number of designs tattooed on the forearms of a female patient of mine. She would be prepared to submit to any course of treatment short of actual excision of the disfigurement.

Selective Inflammation of Tattoo Mark

MEDOC writes: I have recently seen a man in whom the red part (a "heart") of a blue and red tattooed design on the forearm, tattooed twelve months previously, suddenly and for no apparent reason became inflamed and remained so for a week, the blue part being unaffected. The arm is now normal, but the condition seems unusual after so long an interval.

Income Tax

Assessment of Income

W. A. made his return in May, 1941, of his earnings for the year to April 5, 1941. He has since received a notice of assessment as for the year to April 5, 1942, based on those figures. On the other hand, though up to April 5, 1941, he had received only a half-year's dividend on some War Stock bought in 1940, he is charged as for a full year's interest to April 5, 1942. Is this right?

*** Income is normally assessable on the amount of the previous year, and the assessment on the earnings is therefore apparently correct. If, however, a new source of income comes into being during any particular year so that less than a full year's income is received, the assessment for the following year is by law to be made on a full year's income. This differentiates the basis for the two sources of income quoted. Depreciation is allowed in respect of the wear and tear of a car during the year of assessment. Normally no attention is paid to this, but where a car, for instance, is sold early in the financial year the inspector of taxes is correct in taking it into account. As W. A. sold his car on April 15, 1941, he is therefore entitled only to 10/365ths of a year's depreciation allowance.

Employment of Wife

W. W. pays his wife a salary of £52 a year for acting as his dispenser and book-keeper. The points on which he seeks information will be sufficiently clear from the replies below.

*** (1) She is not within the National Health or Unemployment schemes having regard to the amount of salary and part-time nature of her work. (2) If the income-tax inspectors want corroboration of the payment—a somewhat unusual requirement—no doubt proof of payment by cheque would suffice. (3) It is not possible to suggest a proportion to be applied to the gross rental of premises, used partly for private and partly for professional purposes, in order to arrive at the amount deductible for income-tax purposes. What is the correct proportion must depend on the extent and situation of the part used professionally as compared with the whole. It should be borne in mind, however, that the ground floor is the most valuable part of the premises and should be regarded as carrying a relatively larger rent.

Assistant's Car Allowance

A. E. receives £50 per annum from his principal for "use of car." He has recently sold his old car for £30 and bought another for £300. Can he claim any deduction for income-tax purposes?

*** A. E. is assessable under Schedule E, and consequently can claim a deduction only for such expenses as are incurred "wholly, exclusively, and necessarily in the performance of the duties" of his appointment. In general where a specific allowance for expenses is made by an employer the income-tax authorities will refuse to entertain a claim for such expenses, holding that the employer's allowance is presumably adequate. We suggest, however, that our correspondent should make such a claim, contending that the allowance of £50 has proved inadequate in view of wartime replacement costs, and claiming that it should be regarded as covering running costs only, leaving him entitled to the usual rate of depreciation on the £300 expended on the new car—i.e., for the first year 24% of £300=£72. If the inspector of taxes is not prepared to admit such a claim in full he may be open to a compromise on some reasonable fraction of the full amount.

LETTERS, NOTES, ETC.

Chest Radiography

DR. BERNARD LEGGETT (London, E.7) writes: With reference to Dr. E. N. Ramsbottom's letter on the standard of chest radiography (April 25, p. 536), may I, as a medical radiologist of nearly 20 years' experience, which includes several years as senior radiologist at Victoria Park Hospital, seriously question whether the expense of a 250-mA rotating anode tube and requisite high-tension generator is justified, without in any manner querying the value of such an ingenious construction for other radiological purposes. Such use appears to me to go to the opposite extreme of another of your contributors in the same issue, who some years ago "did his own radiology" with a gas-tube and induction coil. Until April, 1941, for some 15 years I had used a Dean 10-kV.A. mechanical rectifier, which, while considered by some as somewhat out of date, produced the desired results. Being twice "blitzed" in 1941, my apparatus was ruined, and for a period of some weeks I carried on my work with a Dean 30-mA "Ward" set, and while restricted in respect to screening, I could still maintain my chest and other radiographic work. Since then I have used a Watson 4-valve 10-kV.A. apparatus. My original apparatus was in 14 years never used more than just over "half-out." My present Watson apparatus gives 200 mA at 140 kV, but I have not found it necessary to use it "half-out" for any work, and of a possible 10 steps I usually use the fourth stud for voltage, and have never gone beyond the fifth for the stoutest patient. Exposure is, for preference, made manually at a "flash," which the time switch records as between 1/10 and 1/5 second with 60 mA at 40 inches distance. While tube-film distances up to 9 feet may be of value in cardiographic work, for purely lung work I am not satisfied there is any advantage in increasing this distance, which only results in more radiation being dissipated by scattered radiation and the inverse square law. I also question whether highly expensive heavy current *x*-ray tubes should be left for operation to any intelligent nurse, but rather to a qualified medical radiologist who can fit the examination to the actual clinical requirements of the case. I believe some years ago the L.C.C. effected great economy by standardizing L.C.C. hospital apparatus, instead of, as previously, each hospital radiologist following his own bent. Apparently Dr. Ramsbottom found some difficulty at the Ministry of Health in obtaining sanction for his particular expenditure. His subsidiary apparatus, which is suitable for a pregnancy case (always difficult), should satisfy all chest requirements.

A Symptom in Epidemic Gastro-enteritis

DR. R. E. HOPE SIMPSON (Beaminster) writes: I think it worth recording an interesting symptom in the recent epidemic of gastro-enteritis. Diarrhoea has often been very severe. Usually even mild diarrhoea causes much pain, soreness, and scalding round the anus. During this epidemic the diarrhoea was cool, and in no case even of prolonged illness did it cause any discomfort at the anus.

Steam Sterilization

DR. JAMES J. PATERSON (M.O.H., Maidenhead) writes in reply to Prof. E. G. T. Liddell's letter on efficient steam sterilization (May 9, p. 593): A simple method of testing the efficiency of steam sterilization is to place an egg in the centre of the bundle and see if it comes out "cooked." If so, the sterilization is in all probability effective; if not, either the method of procedure or the apparatus is faulty.

*** It may be less simple to obtain the egg.—ED., *B.M.J.*

Evolution of the Foot

DR. R. HOPE writes: The point I raised (April 18, p. 510) is quickly settled, and either Mr. Norman Lake or Mr. Pocock can settle it with an authority which I lack. If the foot of the infant ape, like its head, is more human than the foot of the adult ape, then it is arguable that the human foot is archetypal to the ape's foot, and that the ape's foot is a specialized and divergent form of the human foot. I would submit that the question whether or not, like the human mouth and perhaps also the human tonsils, the human foot is retrogressing or degenerating cannot really be decided until we know whether the human foot is an evolved ape's foot or the ape's foot is a degenerated human foot—a point which only embryology can decide.